One Tough Outdoor Finish—Check it out! Page 60

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FEBRUARY 1998 ISSUE 103

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Pages 16 and 62

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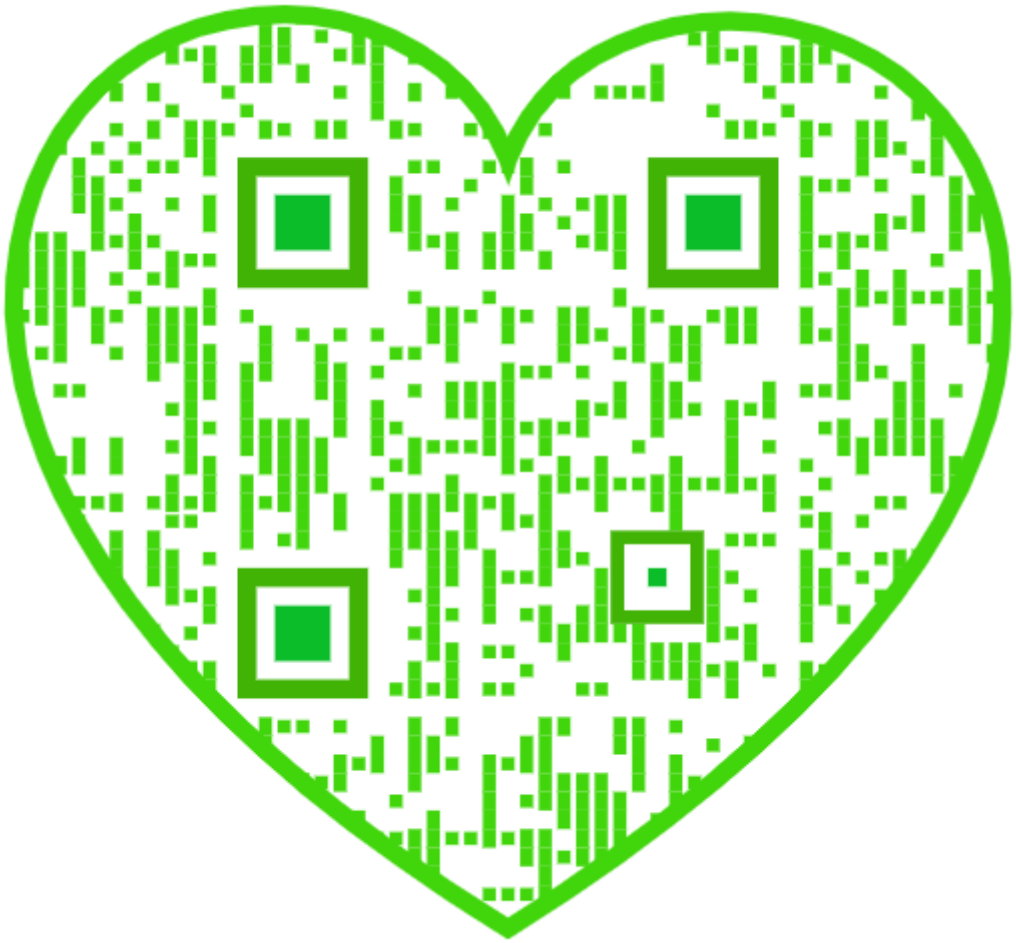

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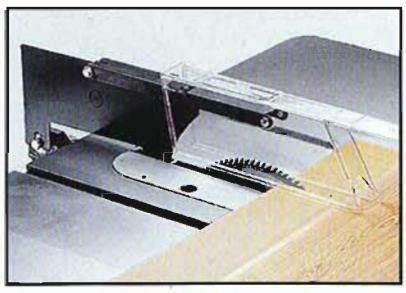

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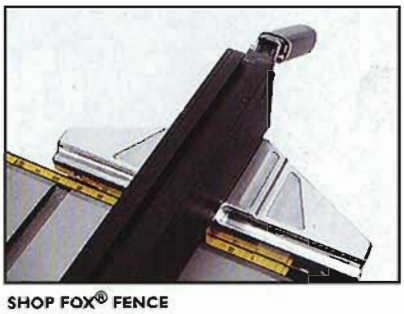

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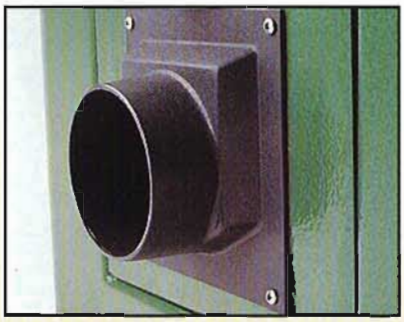

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ISSUE NO. 103 FEBRUARY 1998
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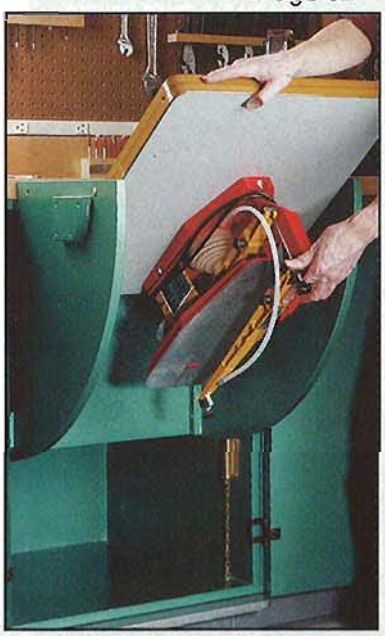

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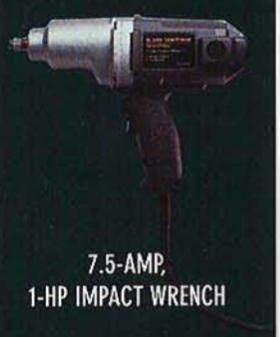

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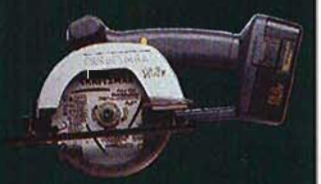

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Better Homes and Gardens® WOOD® magazine (ISSN-0743-894X) is published nine times a year in January, February, March, April, June, August, October, November, and December by Meredith Corporation, 1716 Locust St., Des Moines, IA 50309-3023. Periodicals postage paid at Des Moines, Iowa, and additional mailing offices. Better Homes and Gardens trademark registered in Canada and Australia. Marca Registrada en México. **ONE-YEAR SUBSCRIPTION PRICES:** U.S. and its possessions, $27; Canada, $39; other countries, $47. Canadian GST Reg. #BN 12348 2887 RT. **POSTMASTER:** Send address changes to *Better Homes and Gardens WOOD* Magazine, P.O. Box 55050, Boulder, CO 80328-5050.

CUSTOMER SERVICE INFORMATION: For service on your magazine subscription including change of address, phone toll-free 800/374-9663. Or, write to *Better Homes and Gardens WOOD* Magazine, P.O. Box 55050, Boulder, CO 80328-5050. Please enclose your address label from a recent issue.
EDITORIAL INFORMATION: Address letters and questions to THE EDITOR, *WOOD* Magazine, 1912 Grand Avenue, Des Moines, IA 50309-3379.

ATTENTION RETAILERS: To carry *WOOD* magazine in your store, call 800/659-5990, or write: Select Title Program, *WOOD* Magazine, 900 Kingsland, Batavia, IL 60510.

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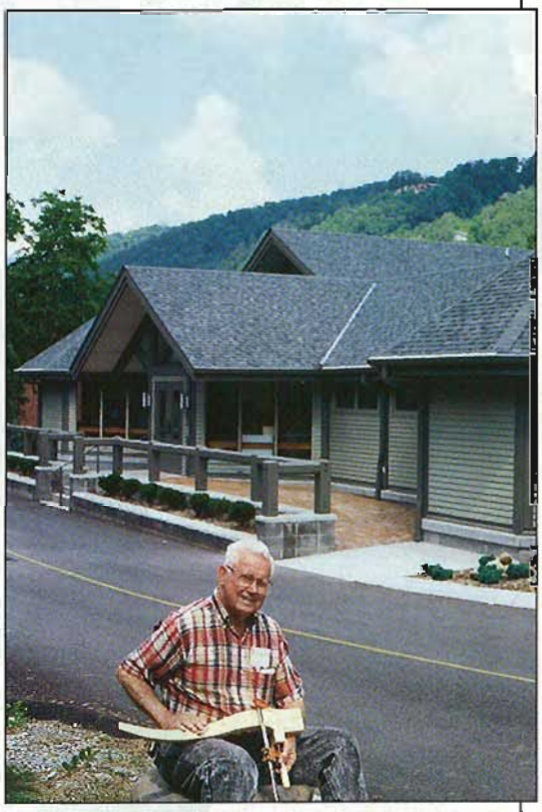
THE EDITOR'S ANGLE

Have you started a woodworking scrapbook yet?

This past summer, I was fortunate enough to attend a week-long photography class at the Arrowmont School of Arts and Crafts in Gatlinburg, Tennessee. My goal was to learn more about lighting, one of the secrets to quality photography.

During the week, I stopped by the new woodworking building at the school on several different occasions to check out what was happening. And what I saw there was a first-class facility with 10 lathes in one room and another well-equipped general-woodworking shop area that accommodates a class of about a dozen students.

Not having been back to school for a while, I had forgotten how much a person can learn by focusing on a subject such as photography or woodworking in a week-long classroom situation. It's really a terrific way to learn.



I snapped this shot of student Allen Johnson in front of the new woodworking building at Arrowmont. And I'm planning to send him a print so he will long remember his woodworking "vacation" and the cabriole legs he made during the week.

It also dawned on me during the week that most woodworkers never take the time to record their woodworking heroics. I know lots of terrific woodworkers around the country who literally can't show me one piece they've ever built. They've either given away or sold their handiwork to a friend, relative, or client, without even giving a thought to making a photograph of the work.

As woodworkers, we are all part of a centuries-old tradition that deserves to be preserved. I urge you to take snapshots of the projects you build, perhaps with the person you give or sell them to.

And while you're at it, have someone take a photo of you working in your shop. Then, start yourself a scrapbook and add to it each time you create something out of wood. I guarantee that you and others will treasure the contents greatly in the years ahead.

Larry Clayton

Photograph: Larry Clayton

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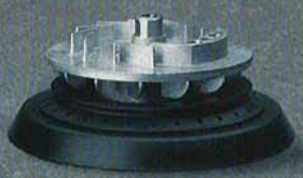

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TALKING BACK

Screwy terminology

I would like to know why the staff at *WOOD*® magazine calls Robertson screws "square-drive" screws. You would never hear a Canadian refer to a Phillips screw as a "star-drive" screw.

P.L. Robertson, of Milton, Ontario, invented the Robertson screw in 1908. The Robertson screw's four efficient mating surfaces allow the screwdriver to seize and hold the screw, nearly eliminating slippage.

—Robert Shortt, Glencoe, Ontario

Language presents some problems when you have readers from a number of countries. While we certainly believe in using accurate terminology, and in giving due credit, we must also use commonly understood language. Unfortunately, many of our readers would not know what we mean if we specify a "Robertson" screw. So, for now we stick with the more descriptive and (in the U.S.) more commonly used term "square-drive."

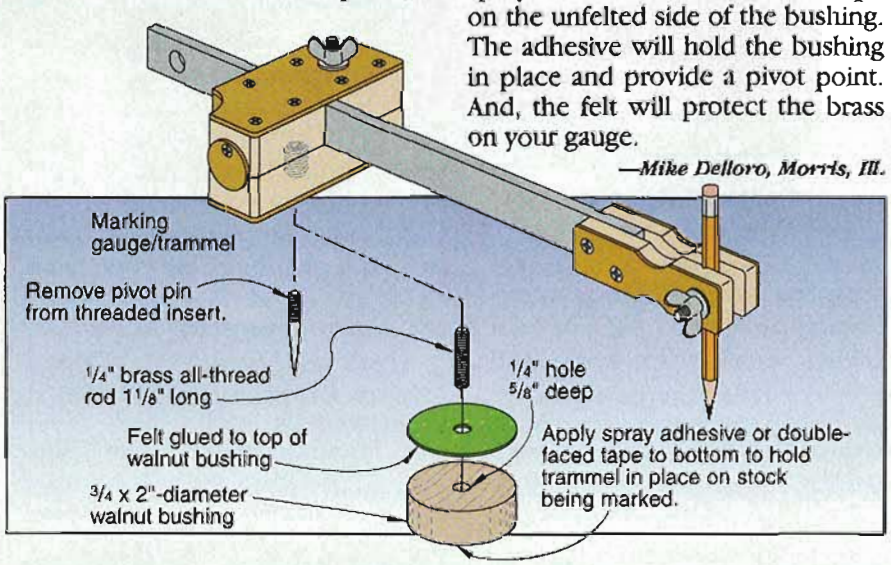
Ooops....

In the *WOOD PATTERNS*® insert in the December 1997 issue of *WOOD* magazine, the nativity pieces are not marked with identifying letters. The manger, sheep, and donkey pieces are parts A-C, and should be made from 1" stock. Make all other pieces from 1½" stock.

A "no-mark" marking gauge

After completing your "Collector's edition marking gauge/trammel" in the August 1997 issue, I discovered a way to improve this handsome tool with a non-marking feature. To keep from marking my material at the center with the trammel point, I made a walnut bushing that protects both the project material and the tool. Construct the bushing using the instructions shown *below*. Then, mark a 2" circle at the center of the material, and apply spray adhesive or double-faced tape on the unfelted side of the bushing. The adhesive will hold the bushing in place and provide a pivot point. And, the felt will protect the brass on your gauge.

—Mike Delloro, Morris, Ill.


Marking gauge/trammel
Remove pivot pin from threaded insert.
1/4" brass all-thread rod 1 1/8" long
1/4" hole 5/8" deep
Felt glued to top of walnut bushing
3/4 x 2"-diameter walnut bushing
Apply spray adhesive or double-faced tape to bottom to hold trammel in place on stock being marked.

Let us know what's on your mind

We welcome your comments, criticisms, suggestions, and yes, even compliments. We'll do our level best to respond to you, perhaps on this page!

Write to us at: Talking Back, *WOOD* Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379. Send e-mail to: woodmail@woodmagazine.com

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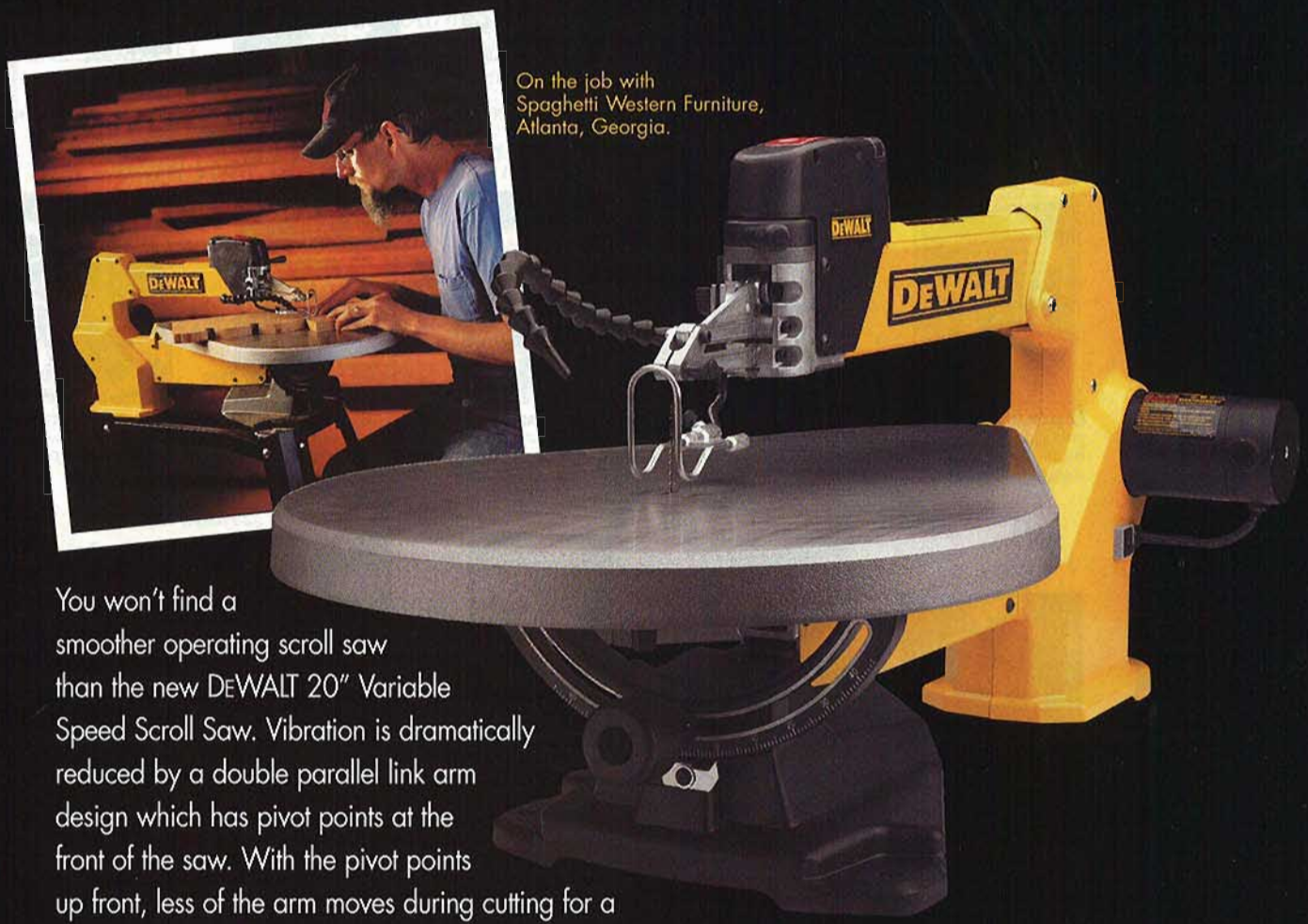
THE NEW DW788 20" VS SCROLL SAW FROM DEWALT

THE FIRST THING IT CUTS IS VIBRATION.



On the job with
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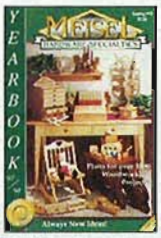

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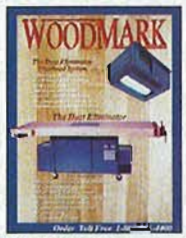

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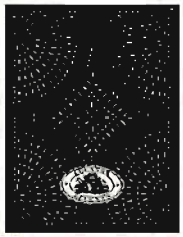

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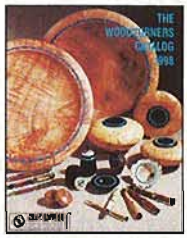

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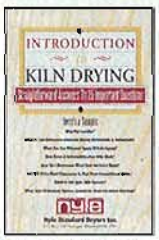

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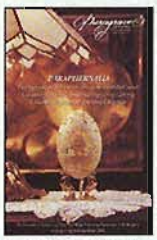

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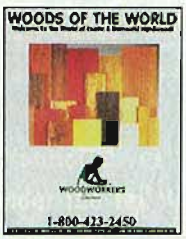

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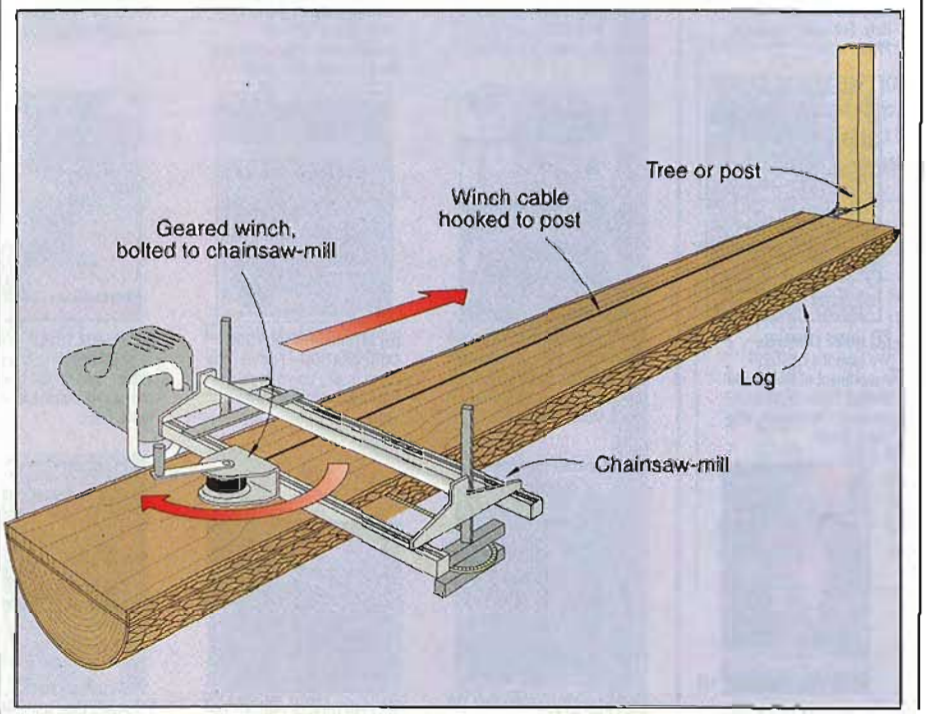
Continued from page 6

Saw and save your back

I enjoyed the "Saw and save by milling your own lumber" article in the June 1997 issue. In fact, I've had my Alaskan Saw Mill Attachment for a number of years and have enjoyed a lot of success with it. But, I found that the mill took a toll on my legs, back, arms, and shoulders.

To lower the physical requirements of milling my own lumber, I attached a geared winch to my sawmill. As shown *below*, I simply line up the log with something sturdy like a tree or post, tie off the cable, and crank my way painlessly down the log.

—Dick Littlefield, Shelton, Wash.



How to revive your abrasives in a jiffy

In your June 1997 issue, you offer some solutions for "loaded" sanding discs used on resinous woods. To rescue my discs and belts, I use a fine-wire brass brush and lacquer thinner.

I pour a small amount of lacquer thinner on the brush, then lightly brush the surface of the disc or belt. When doing this, be careful not to use too much thinner or it will affect the bonding of the abrasive material.

After the hardened resins and other deposits dissolve and the solvent evaporates, I pass a rubber disc cleaner across the surface of the abrasive. At the cost of belts and discs today, an effective cleaning can be a real money saver.

—Lawrence Gubler, Covington, La.

Lawrence, this method works, but as you mention, the lacquer thinner can quickly work its way into the abrasive surface. In fact, it can penetrate to, and soften, the adhesive film that holds the disc onto the machine. For that reason, we don't recommend strong solvents for cleaning adhesive-backed abrasives.

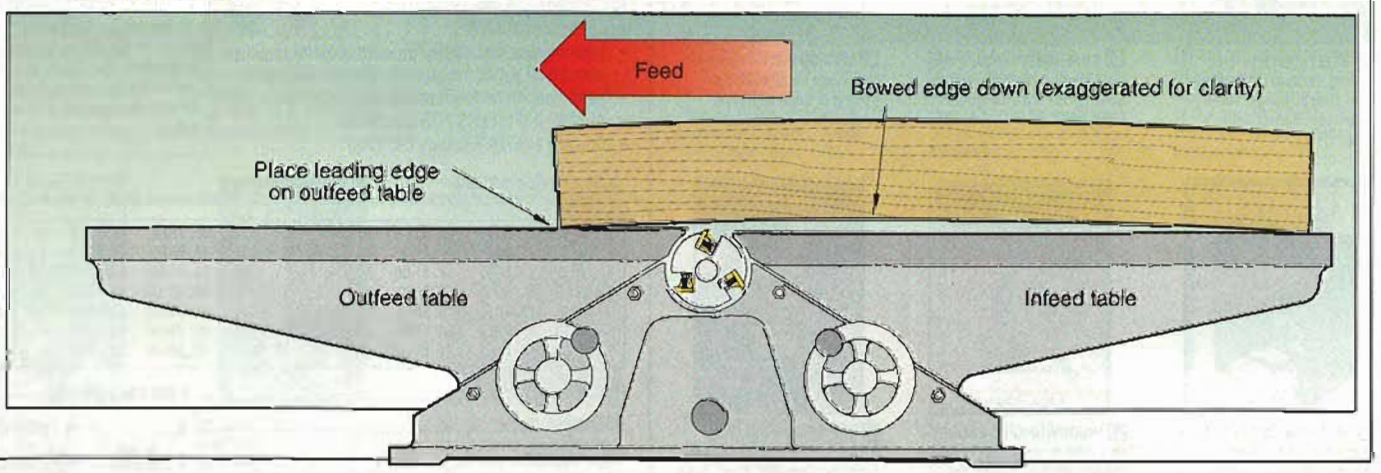
Kicking kick-back on the jointer

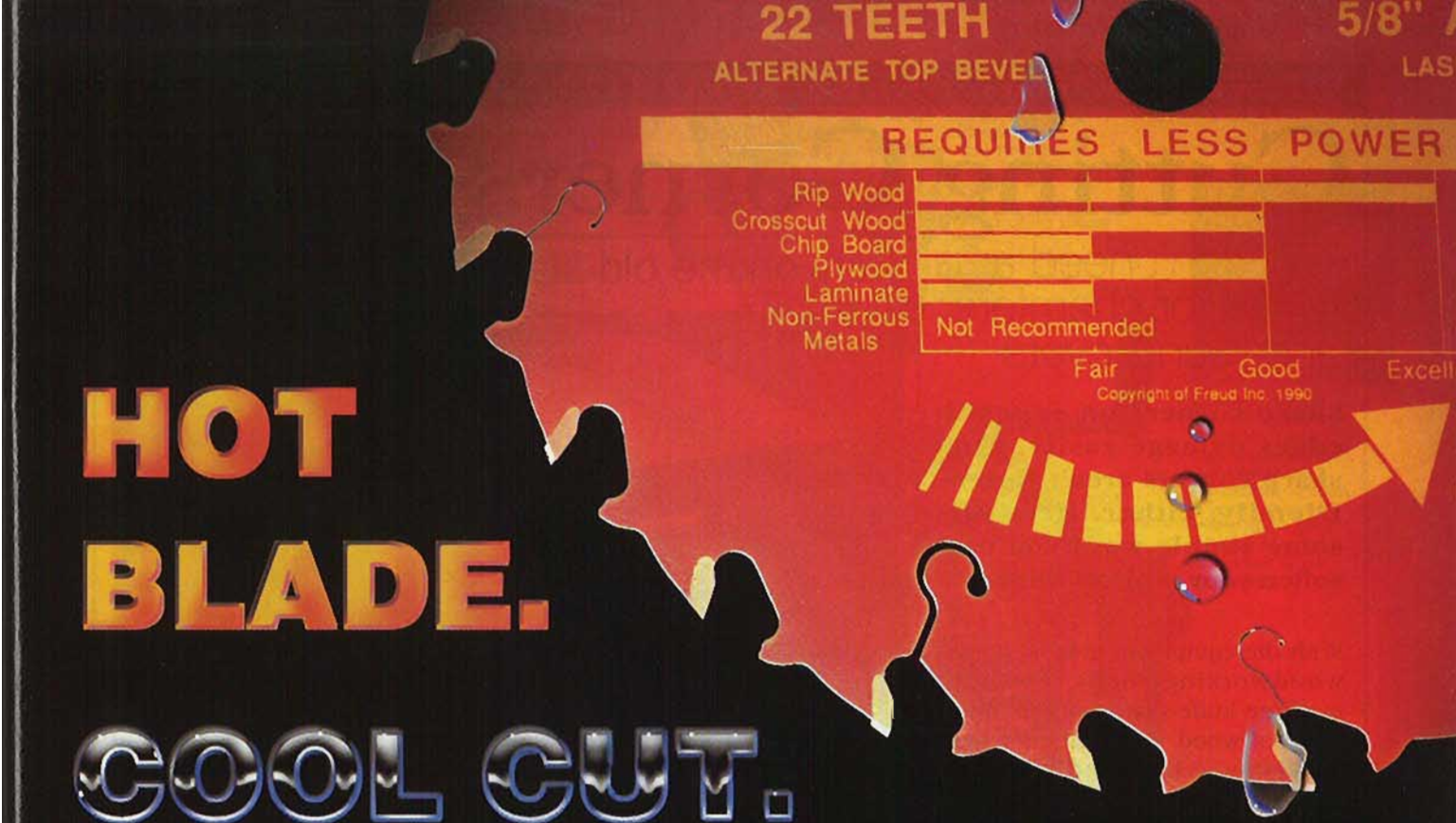
In the June 1997 issue, the article "How to edge-joint bowed stock" raises a safety concern. When edge-jointing a bowed board as shown *below*, the leading edge of the board can drop into the knives and kickback.

To prevent kickback, place the leading edge on the outfeed table, and cut the trailing edge first. Repeat until you have enough flat edge to safely span the gap created by the cutterhead.

—Don Mayo, Fredricksburg, Va.

Thanks for the tip, Don. Not only does your method make the operation safer, it also helps avoid problems with tear-out. Another option, explained in the article, would be to rip a rough straight edge before jointing.





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- Clean up with these blades is also easy. Pitch and resins just don't stick well to the industrial Teflon. So, even after extensive use, simply wipe clean with hot water.
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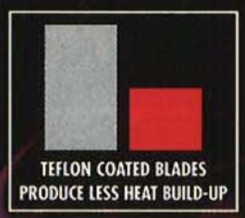

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Cutting Corners

You don't need a router for chamfers and round-overs

Sharp corners on exposed edges damage easily. And sharp corners aren't finger-friendly, either. Here are some simple ways you can soften your projects' edges.

With the equipment in most home woodworking shops, you can machine knife-sharp corners on a piece of wood. That's fine for precise joinery, but exposed edges look better and feel nicer if you soften, or ease, the corners a bit.

Traditional corner-easing treatments include the chamfer and the round-over. A slight one—even if it's barely noticeable—can make a big difference in a project's look and feel. Try these methods to knock off the sharp corners without having to resort to a router and round-over bit.

Rely on the old standby—sanding

You can chamfer or round over a sharp corner with just a few strokes of a sanding block. Removing sharp edges gives your project a finished look and feel.

For back-to-basics easing, just wrap a piece of sandpaper around a scrapwood block. Sand across the corner of the workpiece at a 45° angle as shown *above* to form a chamfer. To minimize the chance of lifting a splinter, sand diagonally across the corner rather than straight along it or straight across it.

A corner will feel smooth yet still look sharp and crisp after just a few strokes with 220-grit sandpaper. For a round-over, roll the sanding block around the corner as you sand.

Take a plane-and-simple approach

A block plane works great for corner chamfering, passably well for rounding over. For fine work, set the plane iron for a shallow cut and narrow the plane's mouth, if it's adjustable. You also could use a spokeshave, right.

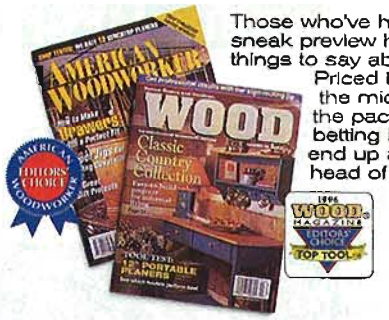
You can break a sharp corner with a few passes of a plane, too. A block plane forms chamfers conveniently, shown *left*. Be sure to plane in the grain direction to prevent tearout. You can plane as narrow or as wide a chamfer as you prefer.

For a round-over like the one shown on the stock in the middle of the photograph, plane a series of narrow chamfers. You can bring the round-over to final form when you finish-sand. It's easier to plane a large-radius round-over than a small one.

You can use virtually any size or style hand plane to soften a corner. A spokeshave, shown in the photo, also works nicely.

Continued on page 14

This Delta exclusive gives you a lock on snipe control. Patent-pending cutterhead snipe control lock stabilizes the cutterhead during operation, for complete rigidity.



Those who've had a sneak preview have nice things to say about it. Priced in the middle of the pack–we're betting it'll end up at the head of its class.

Quick-change 2-knife system includes two high-speed steel, double-edged, reversible knives, a wrench and installation tool for quick and accurate knife changes.

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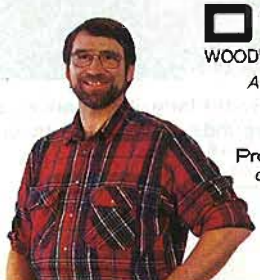
Practical as they are, most portable planers are notorious snipers. If you're looking to minimize sniping without sacrificing portability, check out Delta's new 12½" Portable Planer (Model 22-560), with its exclusive snipe control lock. Call toll free for the name of your nearest Delta dealer. Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.



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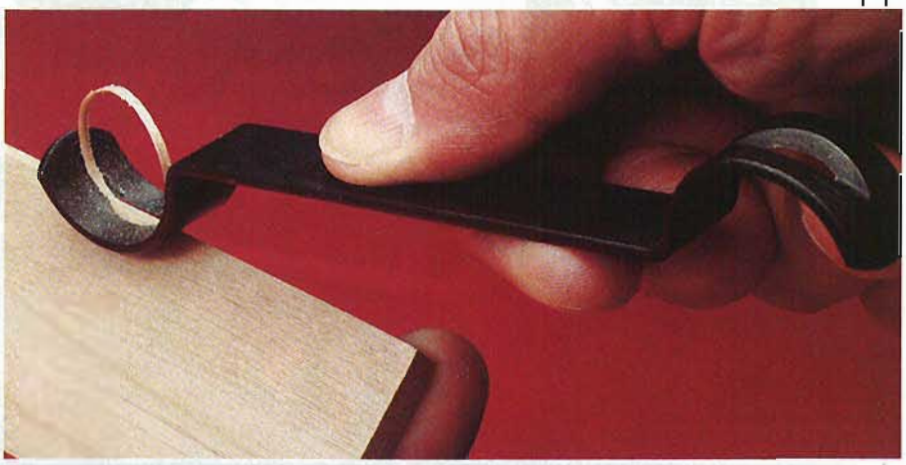
Cutting Corners *Continued from page 12*

Try a corner specialist

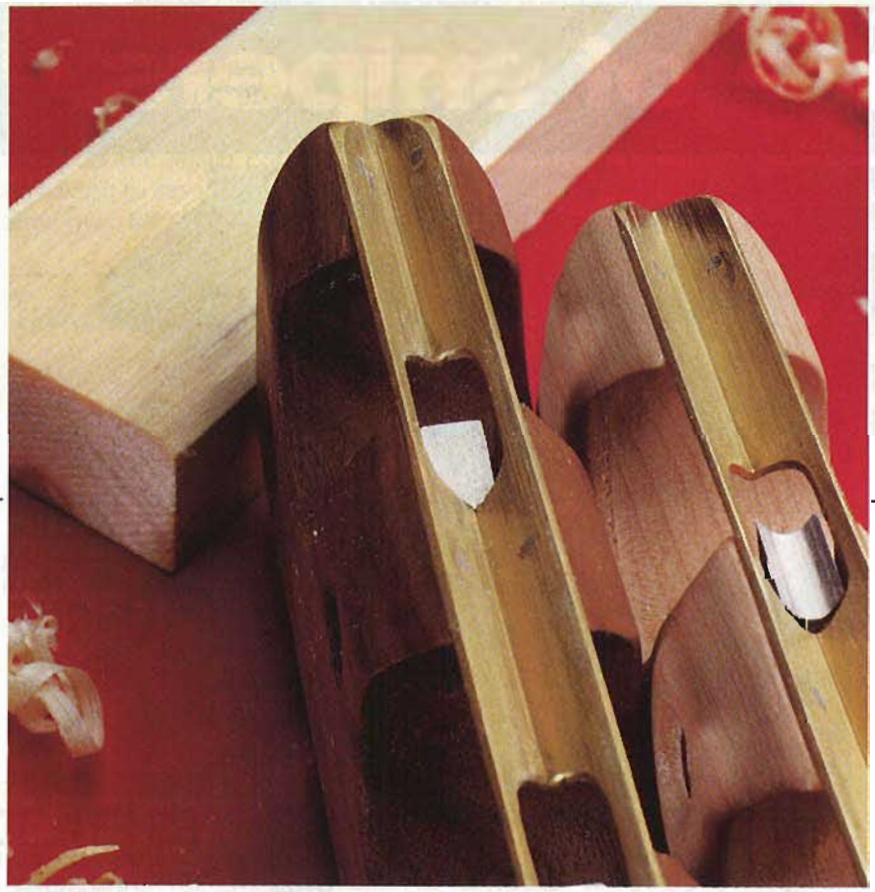
A formed-steel cornering tool like the one shown *right* makes quick work of rounding a corner. Simple and inexpensive, the tool shaves a round-over as it rides along the corner, guided by a machined groove (visible at the raised end of the tool in the photo). The tool cuts equally well on the push or pull stroke.

To avoid tearout, always work with the grain. We found this tool worked well on end grain, too. Each tool (two are available) cuts two different round-over radii—1/16" and 1/8" (the one shown) and 3/16" and 1/4".



Pull or push the cornering tool along the stock for a quick and easy round-over. You need to watch the grain direction for all corner-easing operations.

Opt for a pair of unusual planes



The walnut Radi-Plane, left, carries straight-edged irons to chamfer edges. The maple plane rounds corners with its curved tandem blades.

Brass-and-wood Radi-Planes, *left*, come in two versions, one for rounding over and one for chamfering. Each style features tandem blades; the front one makes the rough cut, the second one finishes it off.

The V-shaped brass bottom centers the plane on the workpiece corner accurately. This, coupled with the fully adjustable cutters, enables the Radi-Planes to form precise, uniform chamfers and round-overs. You can adjust chamfer width, but not the round-over tool's radius—it is ground into the blades.

Where you can buy them

You'll find sandpaper and block planes at most hardware stores and homecenters, of course. Some well-stocked ones may also carry spokeshaves, cornering tools, or Radi-Planes. But woodworking specialty stores and mail-order dealers are more likely to sell these. If you can't find them locally, call Constantine's (800/223-8087), Woodcraft (800/225-1153), or Woodworker's Supply (800/645-9292) for a catalog.

Photographs: Wm. Hopkins

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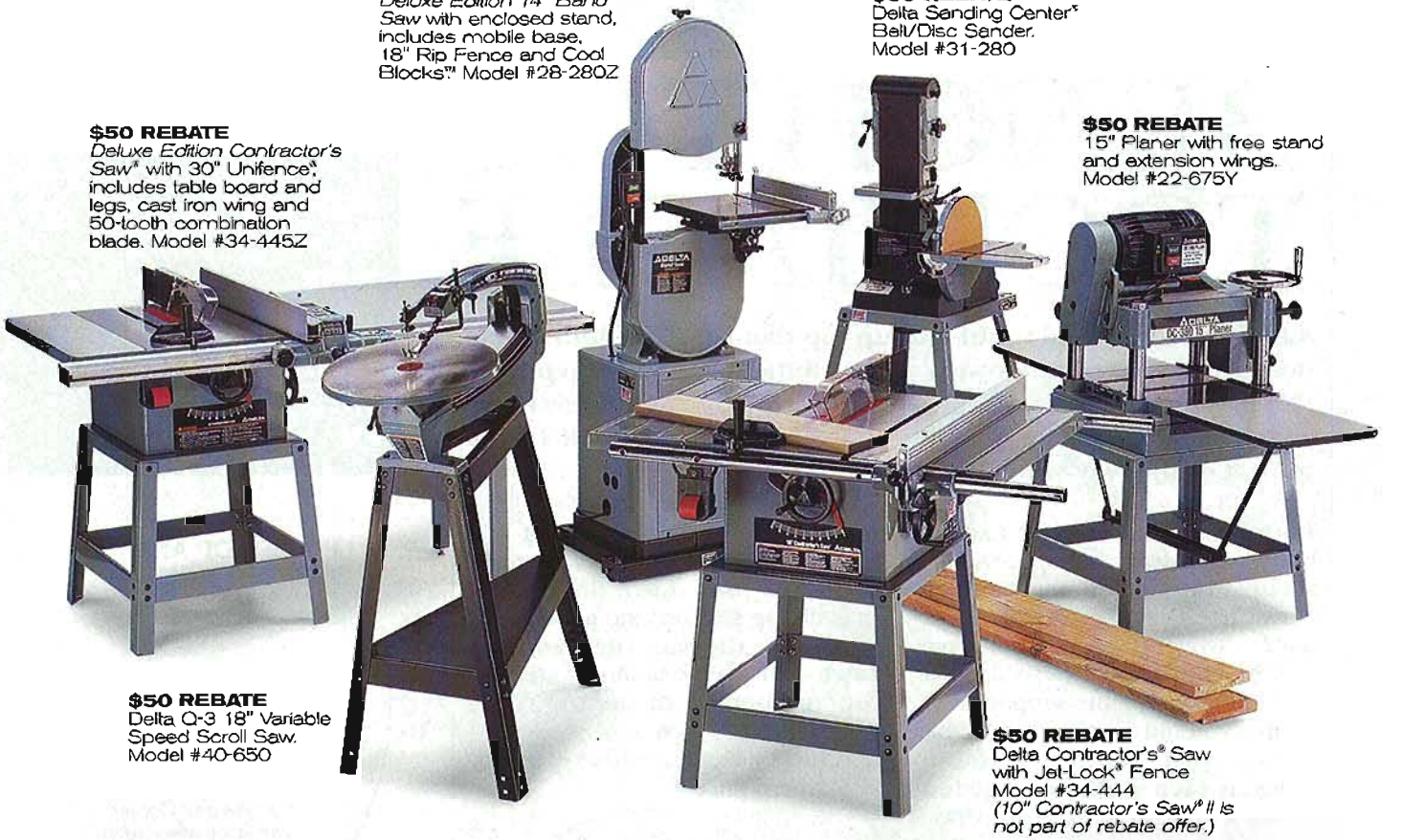

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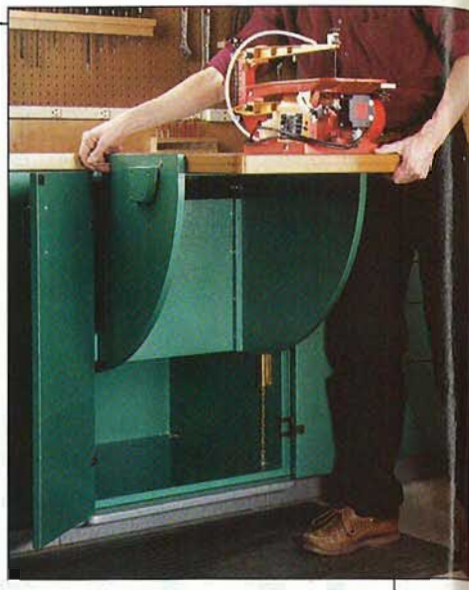
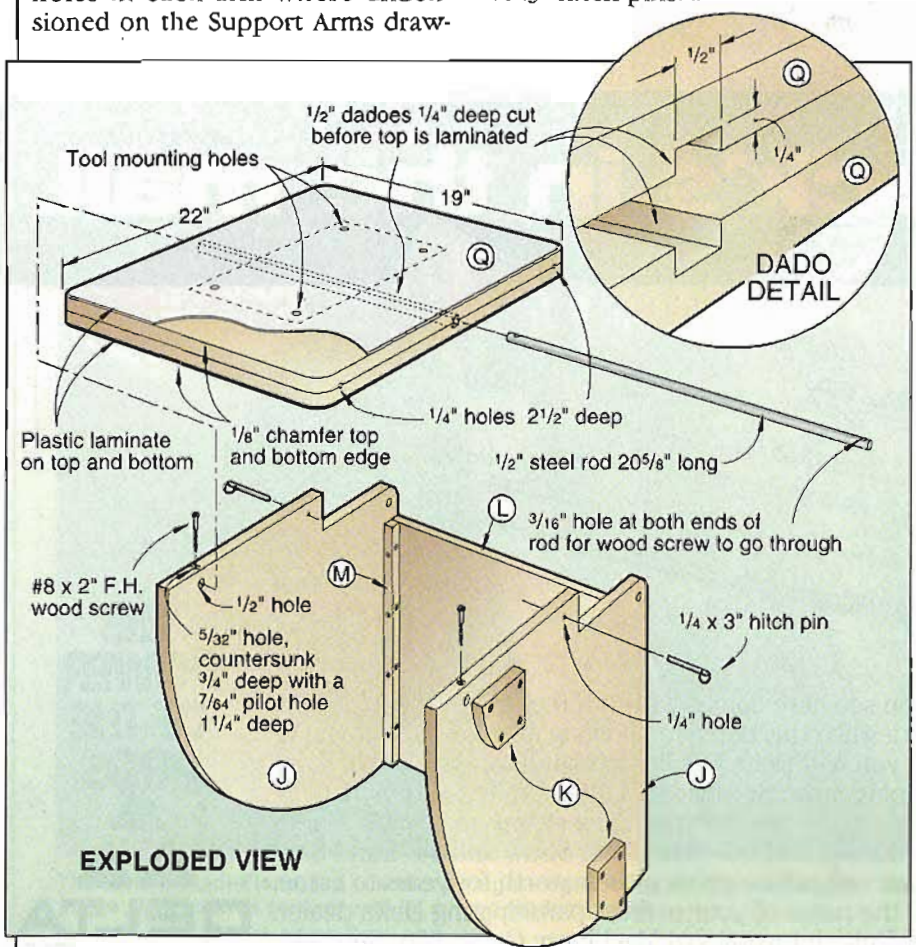
From The Editors Of *WOOD*® Magazine

LIFT-UP BENCHTOP TOOL TABLE

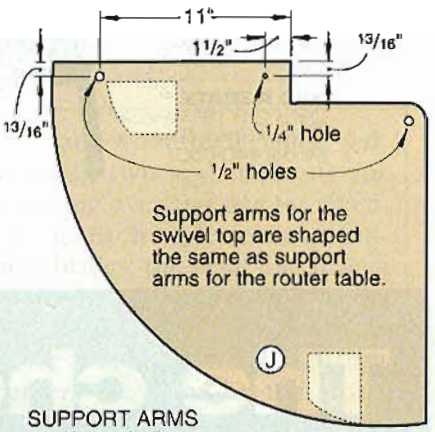


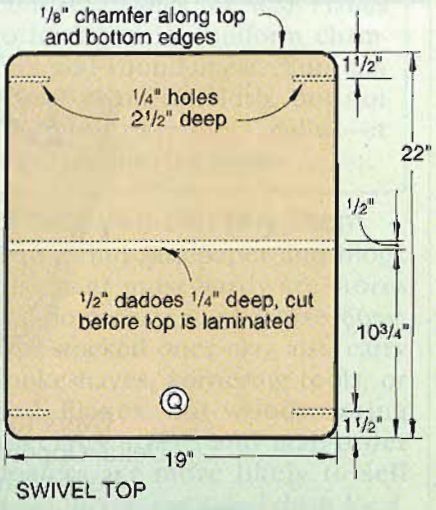
Add a benchtop tool to this lift-up top that fits right into the support arms used on the router-table cabinet described on *page 62*. When you're done using the tool, simply tuck the support arm/top assembly back inside the cabinet, and lock it in place for out-of-the-way storage.

Starting on *page 62*, we explain how to construct the space-saving lift-up router table and cabinet. Now, use the drawings here to build a swivel top to support your favorite benchtop tool. To do this, build the router-table support arms (J) like you did for the router-table version. Then, add the ¼" and ½" holes in each arm where dimensioned on the Support Arms drawing at *right*. Cut two pieces of ¾" sheet goods for the swivel top (Q), cut a dado down the center of each top section, and glue them together, aligning the dadoes. Later, add plastic laminate to the top and bottom of the top (Q). The top swivels on a ½" steel rod and locks in place with a pair of ¼×3" hitch pins.


½" dadoes ¼" deep cut before top is laminated
Tool mounting holes
22"
19"
½"
¼"
DADO DETAIL
Plastic laminate on top and bottom
⅛" chamfer top and bottom edge
¼" holes 2½" deep
½" steel rod 20⅝" long
3/16" hole at both ends of rod for wood screw to go through
#8 x 2" F.H. wood screw
½" hole
5/32" hole, countersunk ¾" deep with a 7/64" pilot hole 1¼" deep
¼ x 3" hitch pin
¼" hole
EXPLODED VIEW

LIFT-UP TOP AND SUPPORT ARMS





Produced by Marlen Kemmet
Project Design: Jan Hale Svec
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EBONIZING

Making wood look like ebony

It's hard to beat the dramatic looks of a jet-black jewelry box, furniture piece, or accent like that used on the clock on *page 42*. But ecological concerns and the skyrocketing price of ebony (up to $50/board foot) keep lots of woodworkers from using this wood. There is an option, though. With ebonizing, or the blackening of wood, you can transform less-expensive woods into eye-catching pieces and accents.

How ebonizing differs from staining

Ebonizing a piece of wood differs plenty from simply staining it black. How? First, when you stain wood, you coat it with pigments. Finely ground pigment particles bond to the surface and pores of the wood after the liquid carrier (turpentine, solvent, or water) evaporates. And second, since the pigment is suspended in the liquid carrier and has to be mixed, the stain is semiopaque. This creates a cloudiness that somewhat obscures the grain. Because of this, black stain makes a poor choice for ebonizing wood.

On the other hand, aniline dye, a commonly used ebonizing product, behaves differently. It completely dissolves like food coloring does and penetrates deeply, coloring each wood cell.

The advantages of water-soluble aniline dyes

Water-soluble dyes have great penetrating power, and they offer good resistance to fading. Another advantage: You don't have to work with a chemical solvent. Because a water dye does not set up as quickly as an alcohol-soluble dye, it makes a better choice for staining a large surface. Water-soluble dyes dissolve best in warm distilled water because the mineral salts in tap water can affect the color of the dye. About the only disadvantage of a water-soluble dye is that it raises the grain of wood. But as you'll see later, this problem is easy to overcome.

How to achieve true black

When you dye a piece of wood, the end result combines the colors in the dye and the natural color of the wood. Most ebony or black aniline dyes are actually made from dark blue and/or green dye powders. To achieve true black in ebonizing certain woods with aniline dye, you should add a very small amount of a red- or orange-colored aniline dye powder to the solution. This will cut down on the blue-green appearance and make the dye a truer black. If you add too much red or orange, however, you'll change the color altogether. Experiment by adding small amounts and then testing it on the wood you'll be using.

It's off to the shop for a trial run

Following label directions, mix one packet of powder to one quart of warm distilled water. Be sure to wear rubber gloves, as the mixture stains skin as well as wood. Sal Marino recommends, "You should always wear gloves and a respirator when applying all types of dye stains. Dye stains in powdered form can cause allergic reactions in some people."

After stirring the mixture vigorously for several minutes, strain the mixture through a disposable cone filter (see the photo *above*) to remove any undissolved powder.

Then, sand the wood pieces with 100-, 150-, and 220-grit sandpaper. Now, moisten a sponge with water and wipe down the areas to be stained to raise the grain. About 30 minutes later, lightly resand these areas with 220-grit sandpaper to smooth the raised grain.

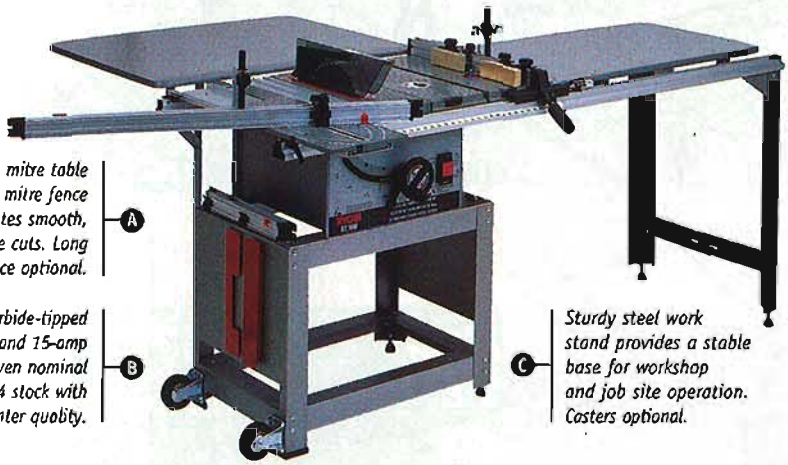
Stir the mixture thoroughly, then using a foam brush, sponge, or even a clean cloth, wipe on the dark mixture. You'll be immediately astonished at just how black the wood becomes. But, it will dry somewhat lighter about 20 minutes later. Apply the dye generously with the applicator. It's important to test-dye scrap stock first to determine if one coat will be sufficient or if you'll need two. Don't forget to apply finish to the test scrap too. As shown on the test block *above* and furthest to the *right*, the area with a lacquer finish looks much darker and richer than the adjoining stained but unfinished area.

Buying Guide

Supplies: Water-soluble dye stain powders; 1 oz. black, #WS505; 1 oz. golden amber maple (reddish), #WS1567. Professional-quality full-protection gloves, medium size, #RG4; large size, #RG5. Disposable cone filters, pack of 12, #HYD38. For shipping charges and to order, contact Constantine, 2050 Eastchester Road, Bronx, NY 10461, or call 800/223-8087.

WE'RE NOT SAYING THE HEAVENS OPENED UP THE MOMENT THE BT3000 WAS CREATED. THEN AGAIN, IT WAS RATHER BRIGHT THAT DAY.

[Shown with optional accessories.]



The sliding mitre table with precise mitre fence promotes smooth, accurate cuts. Long mitre rip fence optional. (A)

The 10" carbide-tipped blade and 15-amp motor rip even nominal 4x4 stock with near-jointer quality. (B)

Sturdy steel work stand provides a stable base for workshop and job site operation. Casters optional. (C)

Sliding rails and tables allow extra support for right-or left-of-blade operation. (D)

When using the adapter kit, table accepts inverted jigsaw or router, providing jigsaw and shaper functions. (E)

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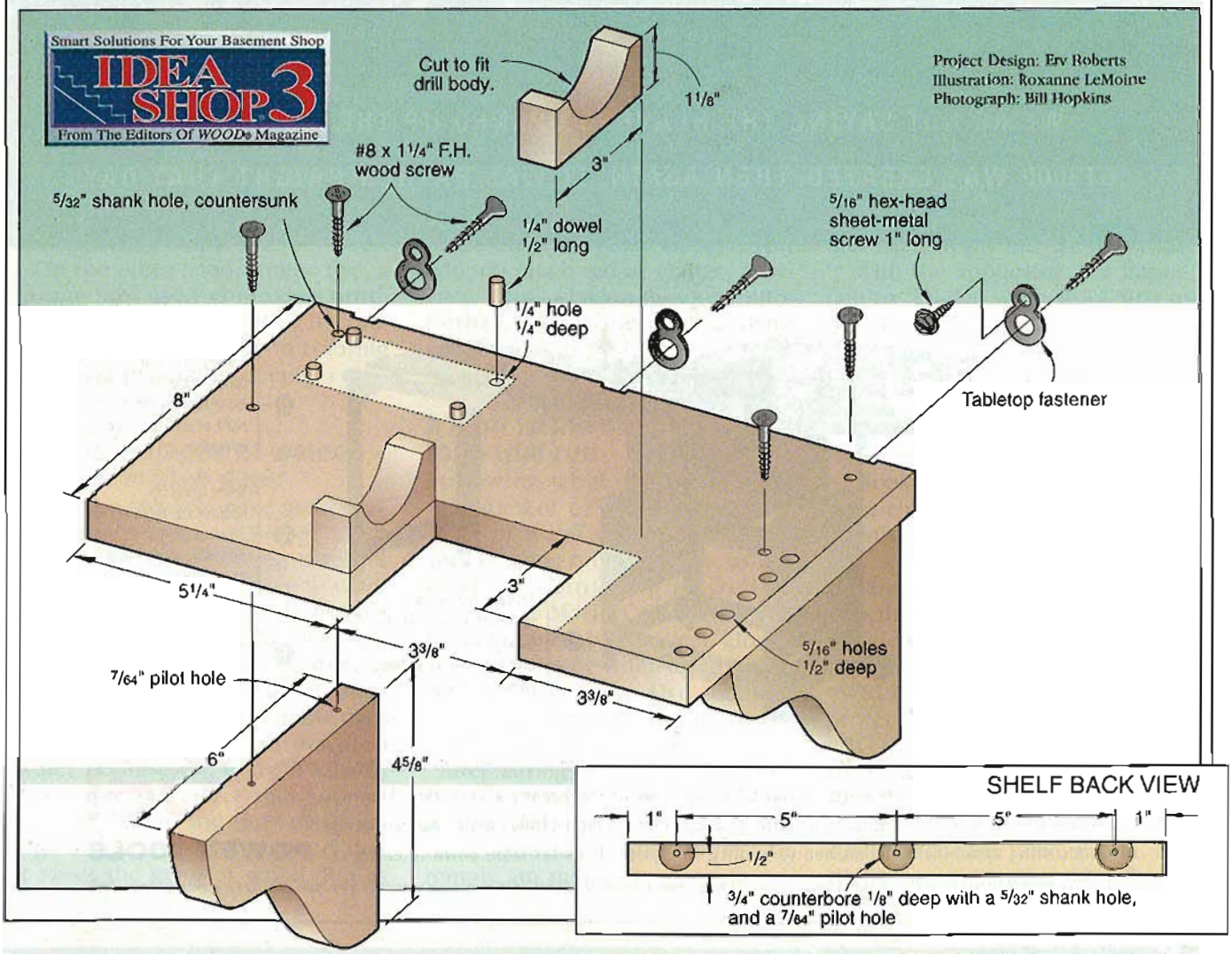
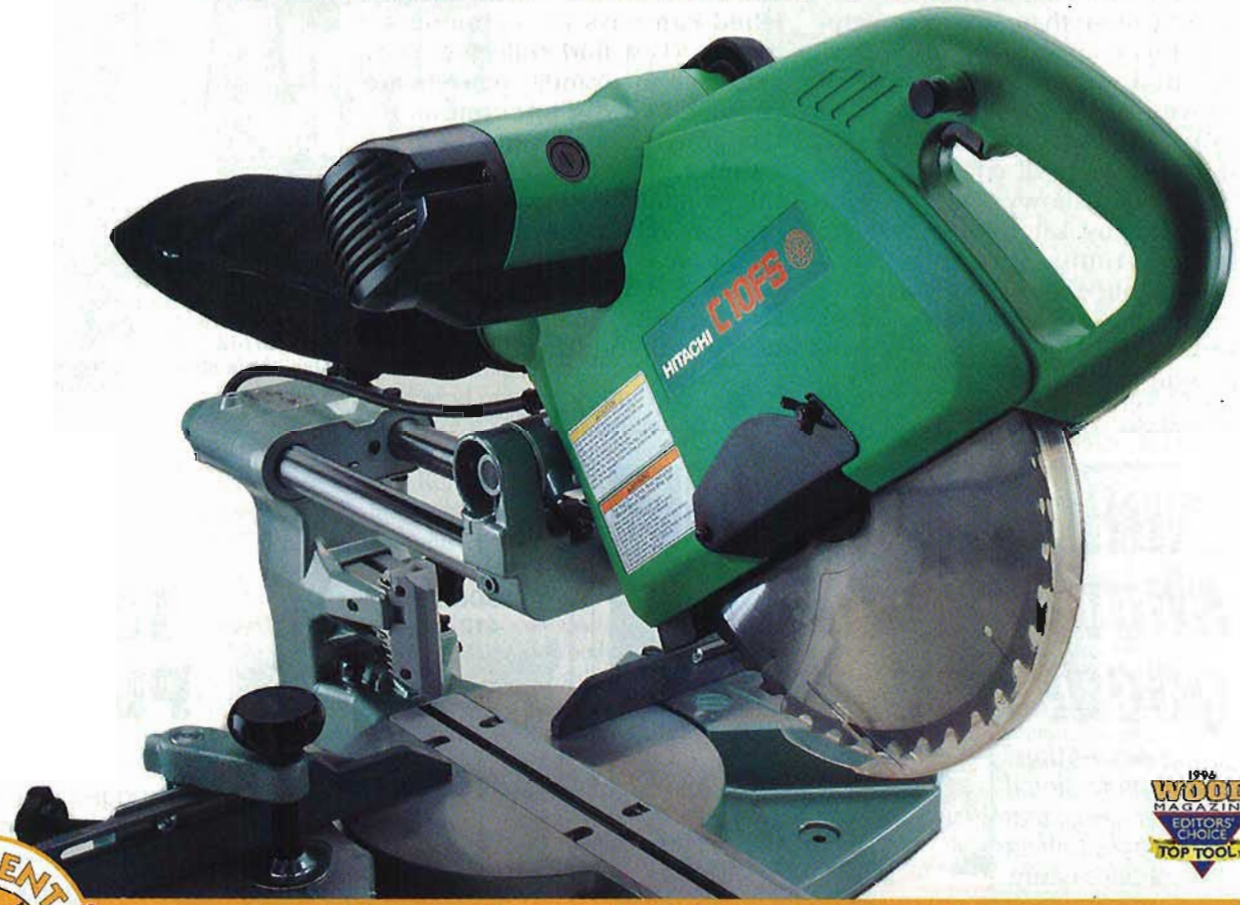
You'll need to customize the stand to accommodate your particular drill and charger. (We built the stand shown for a Hitachi DS13DV2B T-handle drill). For instance, if you have a pistol-grip style drill, you may need to shift the grip opening to the right and modify or reposition one or both cradle brackets to hold the drill.

The charger's feet fit over short lengths of dowel to keep the charger from shifting on the stand. To position the dowels correctly, touch an inkpad lightly to the charger's feet, then set the charger on a sheet of paper to make a pattern. Transfer the pattern to the stand, and drill holes for the appropriate dowels. If your charger's feet won't accept a dowel peg, drill holes in the top of the stand into which the feet will fit snugly.



THAT WHINE YOU HEAR IS JUST THE COMPETITION



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WOOD ANECDOTE

MANZANITA California's mountain driftwood

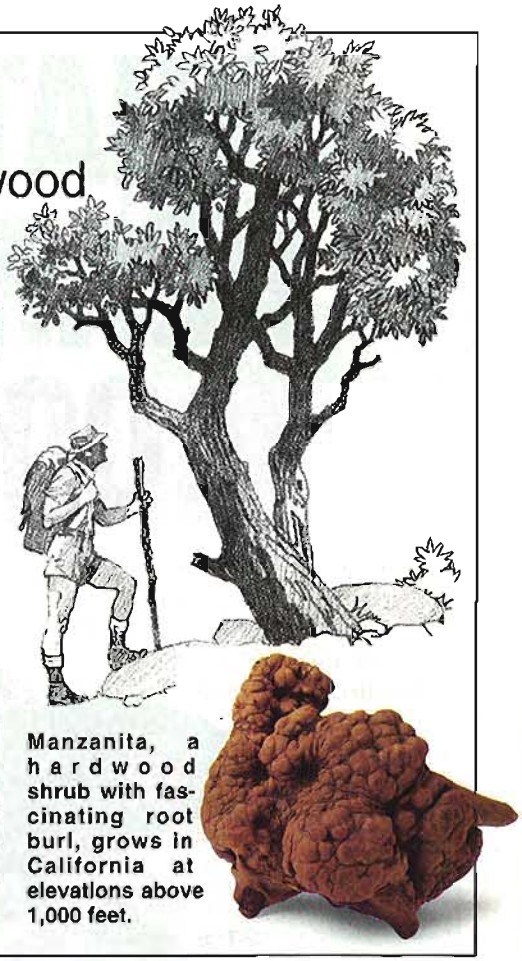
Not a magnificent shrub in stature, girth, or symmetry, the common manzanita (*Arctostaphylos manzanita*) still stands out against its California habitat. The brown chaparral and bleak earth background highlight the manzanita's remarkably smooth, tight-fitting skin of dark red on its trunk and intertwined branches.

Rarely more than 30' tall at maturity, this native of the dry inland mountains sports an evergreen crown often spreading as wide as its height. Come the winter rainy season, it puts all competitors to shame with showy white or light pink blooms. Later in the year, its twisted limbs bear tiny fruits which the state's Spanish-speaking pioneers dubbed "little apples," thus giving the plant its present name.

With its gnarled shape and squat trunk, the manzanita never attracts lumbermen. Local crafters, however, find the manzanita's branches appealing in floral arrangements. But in the roots they discover perhaps manzanita's most intriguing aspect. Beneath the ground lies a fascinating burl that when sawn, cleaned, and polished can pass for ceramics or marble. (Lest burl collectors decimate the manzanita, permits are required to dig specimens on California's federal lands.)

Under the woodturner's touch, this "mountain driftwood" evolves into naturally colorful weed pots and vases. But beware of this beauty. The burls frequently grow around rocks that remain undetected until suddenly hit by a turning tool!

Illustration: Jim Stevenson



Manzanita, a hardwood shrub with fascinating root burl, grows in California at elevations above 1,000 feet.

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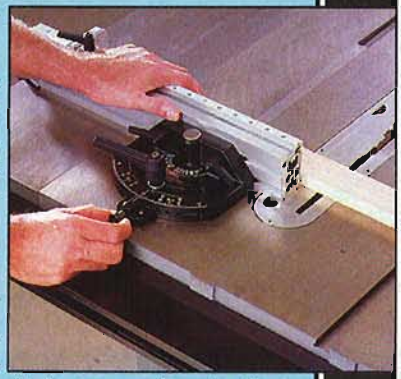

We do not recommend operating without the saw blade guard, as is shown here.
US Patent #5,038,486

Optional accessories: manual clamp– pneumatic clamp– 3/8" x 3/4" miter bar–

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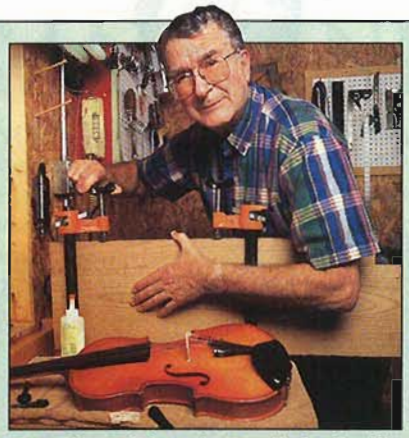

Top Shop Tip winner E.A. Smith developed this benchtop clamping system.

Many of us spend some of our spare time just fiddlin' around in the workshop. But North Carolina woodworker E.A. (Al) Smith really does fiddle in his shop. Al builds (and sometimes plays) fiddles, mandolins, and other folk instruments.

Al's winning tip, detailed at *right*, gives new meaning to hold-down clamps. Really a clamping system, it lets you configure clamps in just about any arrangement.

Using your imagination to solve a particular woodworking problem may be worth $40. If we select your idea as the Top Shop Tip, you'll win a tool prize valued at $250 or more, and we'll include your photo in this column. To submit a tip, send a letter, including your daytime phone number, and a photo or drawing of your idea, to:

Tips from Your Shop
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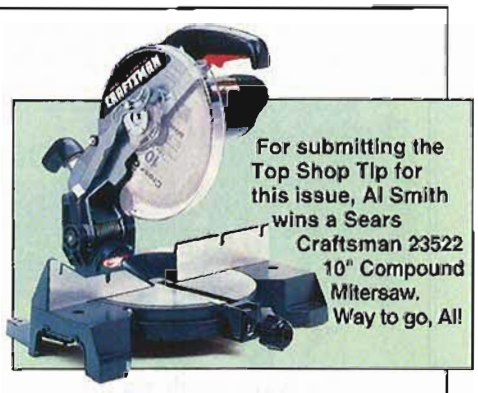
Bill Krier
ASSISTANT MANAGING EDITOR

Benchtop hold-downs offer flexible clamping

I needed to clamp together a complex assembly with pieces arranged at a couple of different levels. But my standard clamps lacked the reach and versatility that I needed, so I came up with a benchtop clamping system that adjusts to most any project.

I based the system on Pony #56 Pipe Clamps which have the release clutch and clamping screw both located in the head assembly. I began by drilling 1 1/16" holes through my benchtop and then mounting pipe flanges on the underside of the bench, as shown *below*.

Now, I can mount 3/4" pipes of various length in the flanges, then slide one or more Pony #56 clamps onto the pipes. To hold a piece above the benchtop, I flip the bottom clamp upside down, then clamp the workpiece between the two opposing clamps.

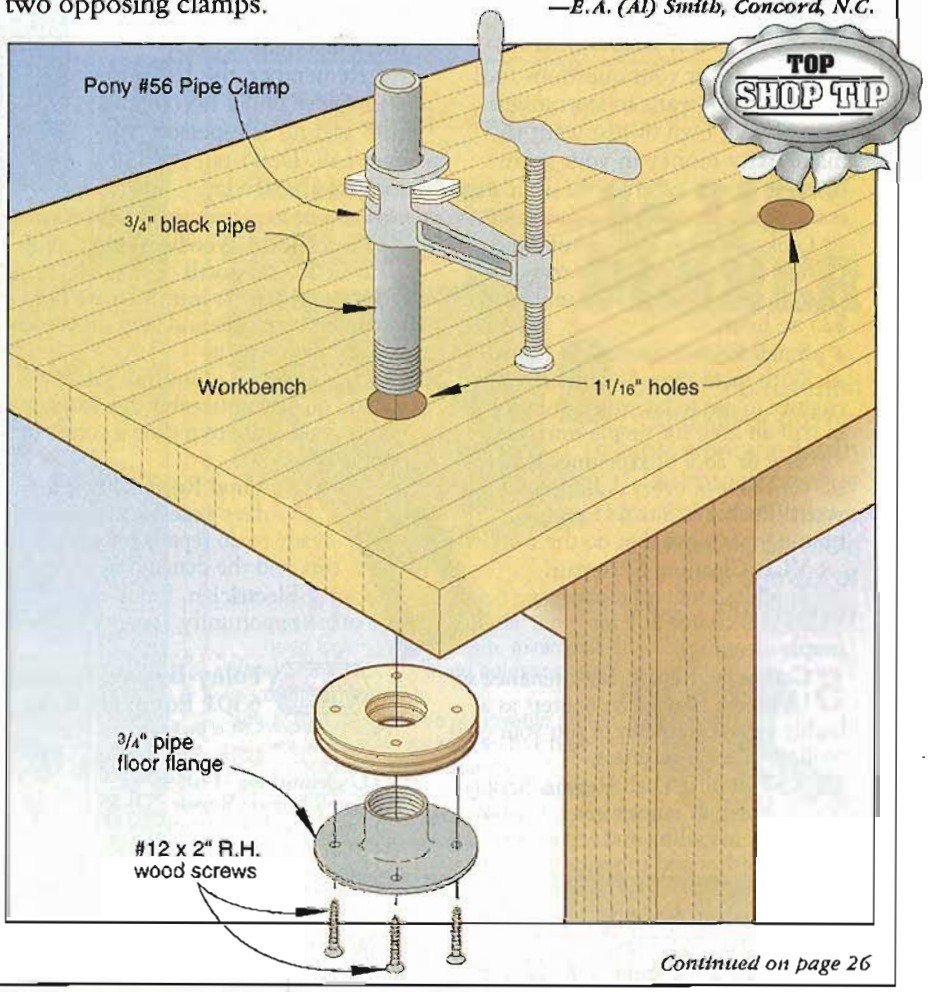


For submitting the Top Shop Tip for this issue, Al Smith wins a Sears Craftsman 23522 10" Compound Mitersaw. Way to go, Al!

Because the flange threads are tapered, you can screw a threaded pipe end into the flared end of the flange only. So, you need to position the flange as shown *below*, and add a 3/4"-thick wooden "doughnut." Also, when mounting the flange, install a piece of pipe in it for proper alignment.

When I'm not using the clamps, I drop short pieces of 3/4" schedule 40 PVC into the holes. They sit on top of the flanges, flush with the benchtop, and give me a plastic-reinforced hole for a 3/4"-diameter bench dog.

—E.A. (Al) Smith, Concord, N.C.



Continued on page 26

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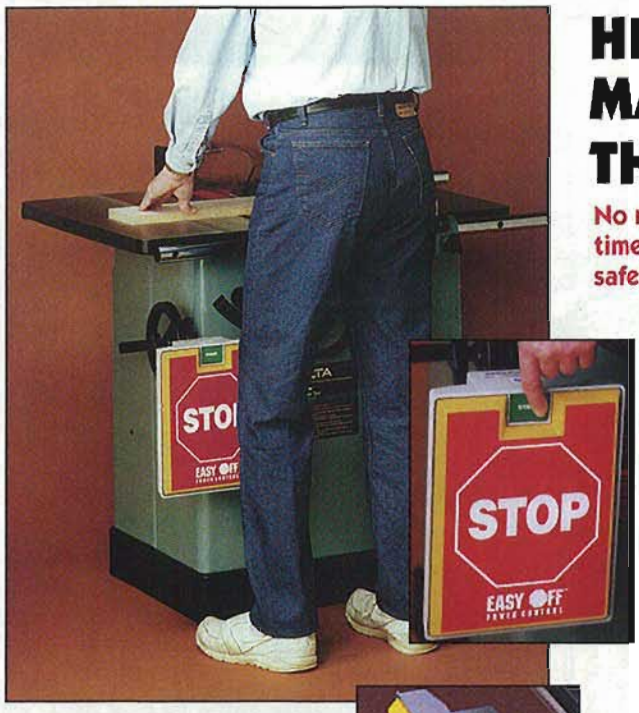

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TIPS FROM YOUR SHOP (AND OURS)

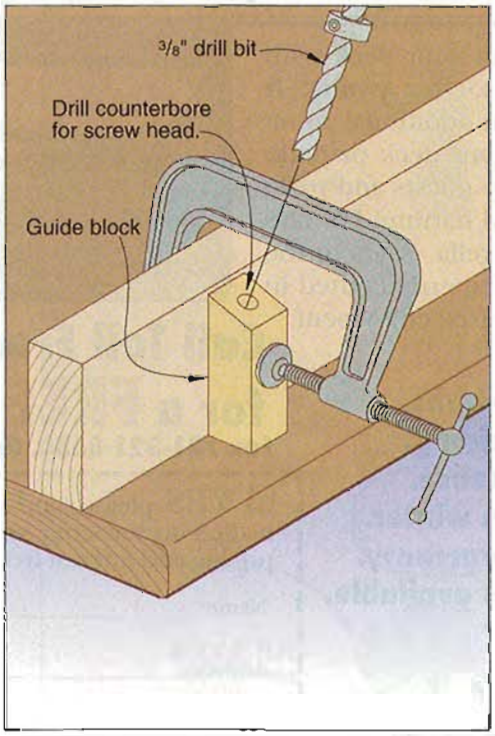
Continued from page 24

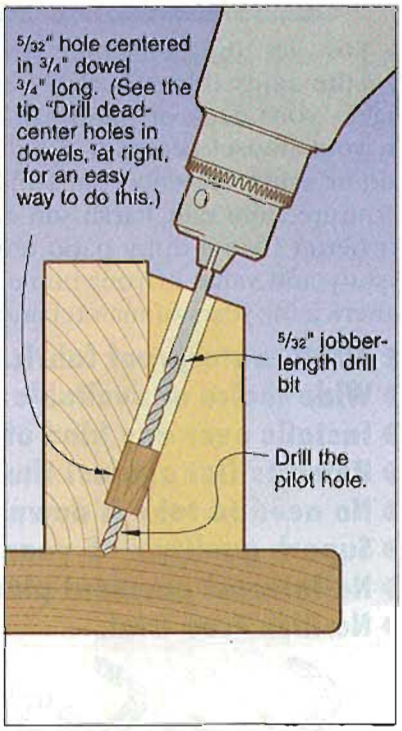
Dowel and extra-length bit make substitute step drill bit

A simple pocket-hole jig works great if you have a step drill bit—a ⅜" bit with a ⅛" pilot tip. If you don't, here's an idea that will come in handy.

I use a standard ⅜" bit with a stop collar on it to drill through the jig and into the stock to make the counterbore for the screw head. Then, I drill a 5/32" hole through the center of a ¾"-long piece of ⅜" dowel. When I slip the dowel over a long, jobber-length 5/32" bit as shown at *right*, the dowel follows the first hole and acts as a guide while I drill a pilot hole for the screw shank. When the dowel gets reamed out, make a new one. You can drill other sizes of pilot holes through the dowel, and many tool catalog companies carry the jobber drill bits.

—Leonard S. Treppa, Warren, Mich.

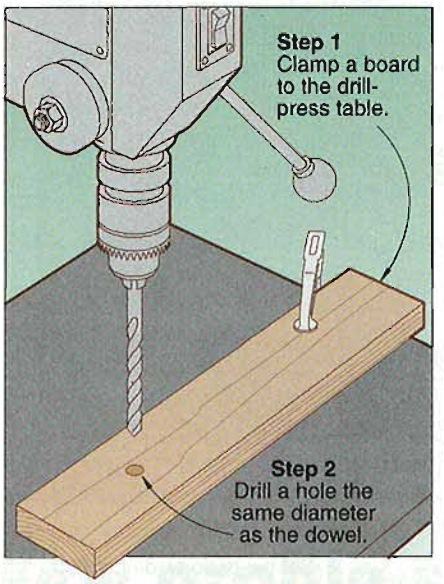


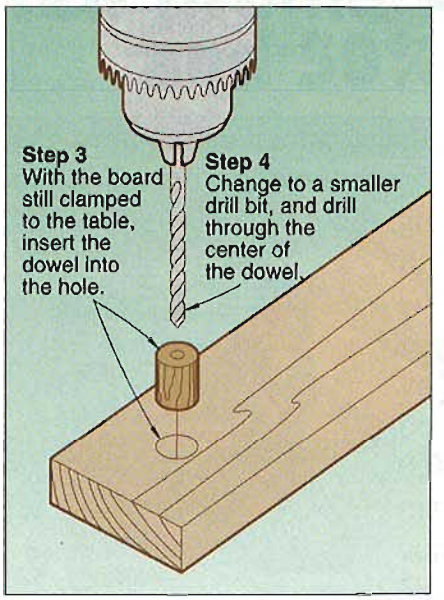

5/32" hole centered in 3/4" dowel 3/4" long. (See the tip "Drill dead-center holes in dowels," at right, for an easy way to do this.)
5/32" jobber-length drill bit
Drill the pilot hole.

Drill dead-center holes in dowels

Drilling a hole through the center of a short dowel, as mentioned in the previous tip, sounds tricky, but this method makes it simple. Clamp a scrap board to the table of your drill press, and drill a hole in it the same diameter as the dowel. Without moving the board, insert the dowel into the hole. Chuck a smaller bit in your drill press, and you're ready to drill right through the center of the dowel.

—Jim Downing, Design Editor,
WOOD magazine




Step 3
With the board still clamped to the table, insert the dowel into the hole.
Step 4
Change to a smaller drill bit, and drill through the center of the dowel.

Continued on page 28

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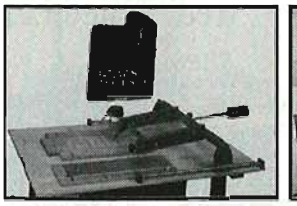
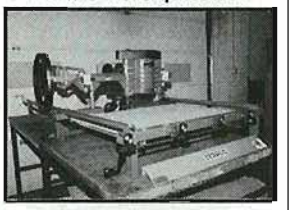

Model CM614 Sign Carver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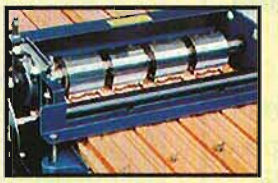
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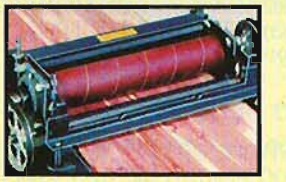
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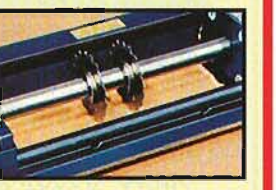
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TIPS FROM YOUR SHOP (AND OURS)

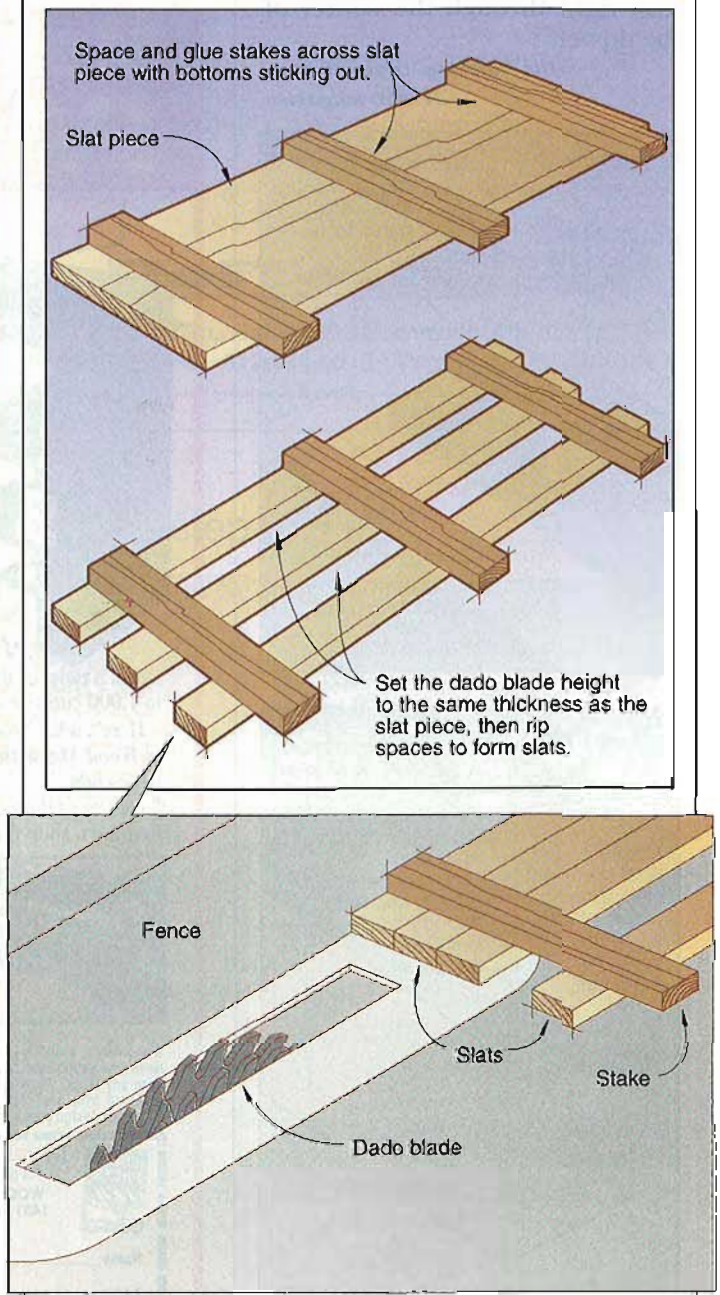
Continued from page 27

Create slatted sides for toy truck beds easily

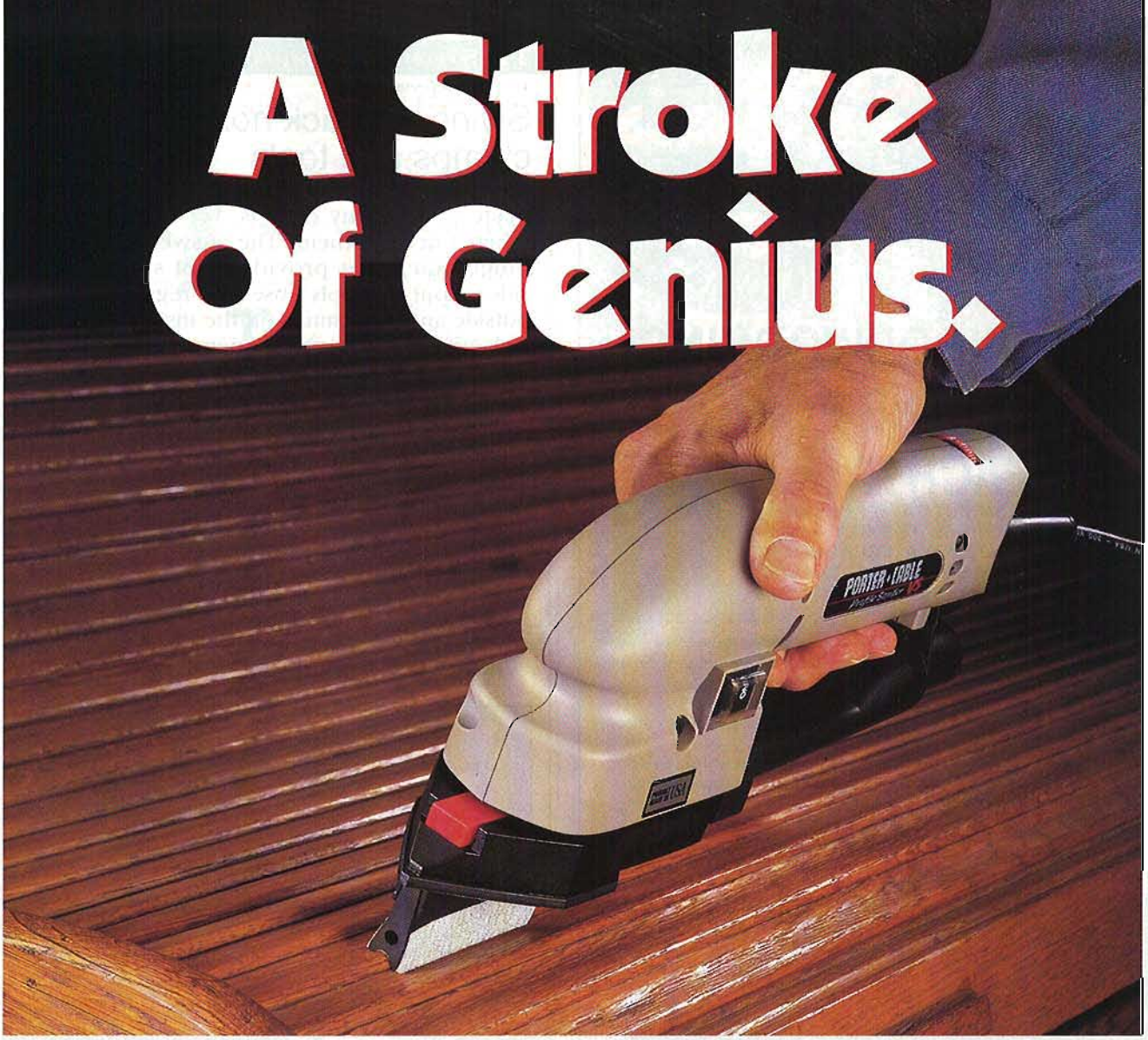
I build lots of toy cars and trucks so I'm always looking for simpler and faster ways to build them. One particularly time-consuming job was ripping and gluing up thin strips of wood for making slatted, stake-side panels for truck beds. My solution wastes a little more stock, but the time saved makes it worthwhile.

I glue the stakes to a solid piece of stock the size of the finished slats, as shown *below*. When the glue dries, I use a dado set in my tablesaw to cut away the material between the slats

—Richard Rosencrans, Cody, Wyo.


Space and glue stakes across slat piece with bottoms sticking out.
Slat piece
Set the dado blade height to the same thickness as the slat piece, then rip spaces to form slats.
Fence
Slats
Stake
Dado blade

Continued on page 30



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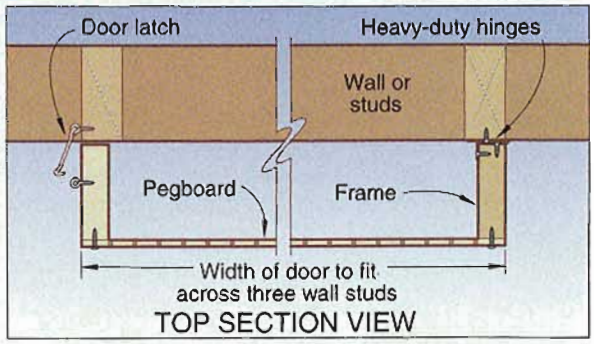
TIPS FROM YOUR SHOP (AND OURS)

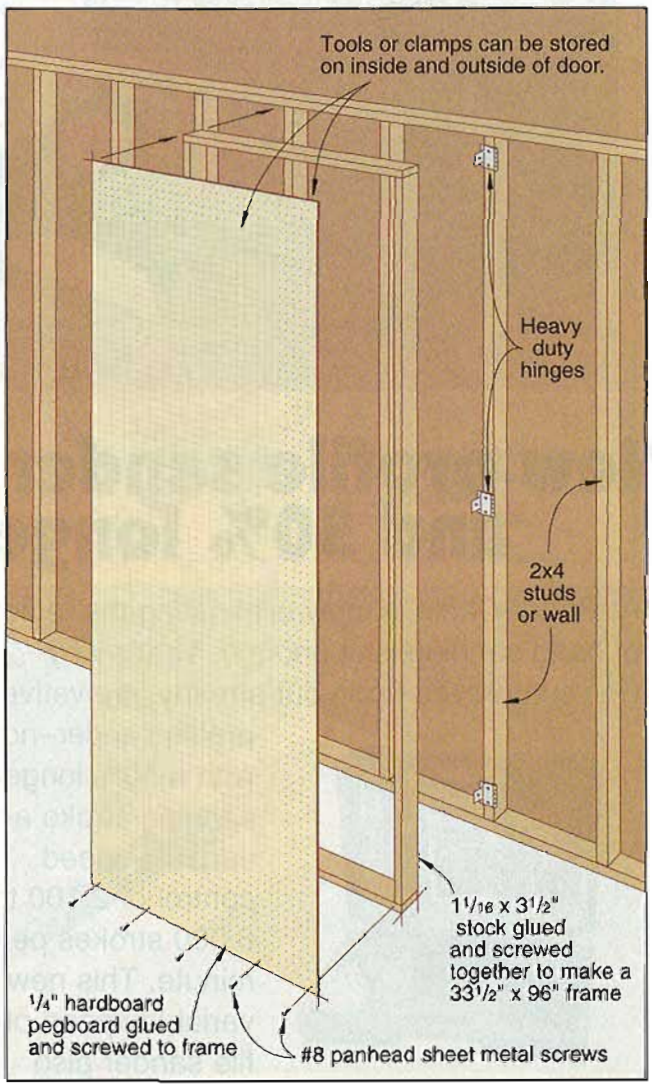
Continued from page 28

Swing-out rack holds clamps and tools

With shop storage space at a premium, I needed a place to store my clamps, yet keep them handy when I needed them. The answer was to build a hinged rack that provides tool storage on both sides. I put the tools I use on a regular basis on the outside and the clamps on the inside. When I need a clamp, I swing the rack open and I'm ready to go.

—Kevin Hemmingsen, Wabasha, Minn.




Tools or clamps can be stored on inside and outside of door.
Heavy duty hinges
2x4 studs or wall
1 1/16 x 3 1/2" stock glued and screwed together to make a 33 1/2" x 96" frame
1/4" hardboard pegboard glued and screwed to frame
#8 panhead sheet metal screws

Continued on page 33

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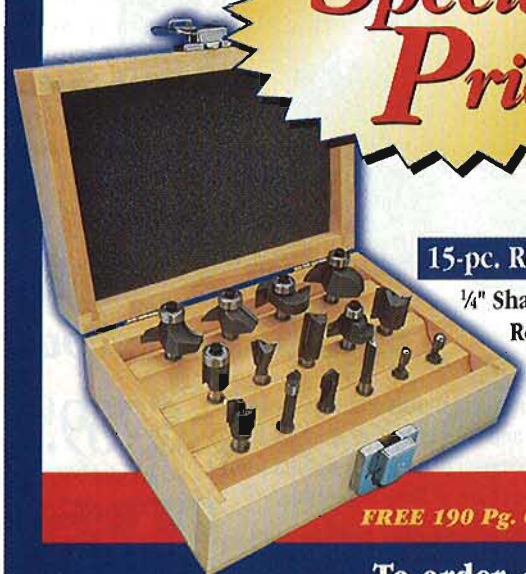

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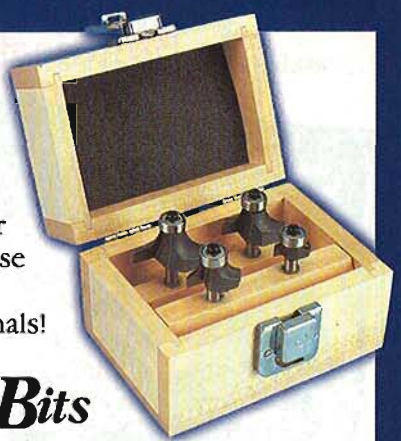

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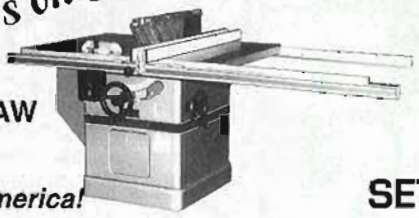

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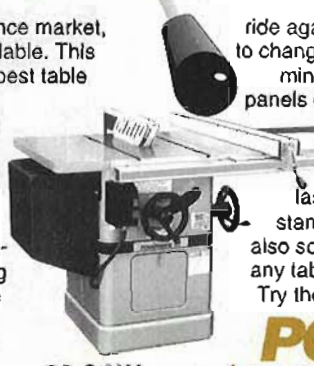

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*Better Homes and Gardens® WOOD® Magazine (Nov. '95)

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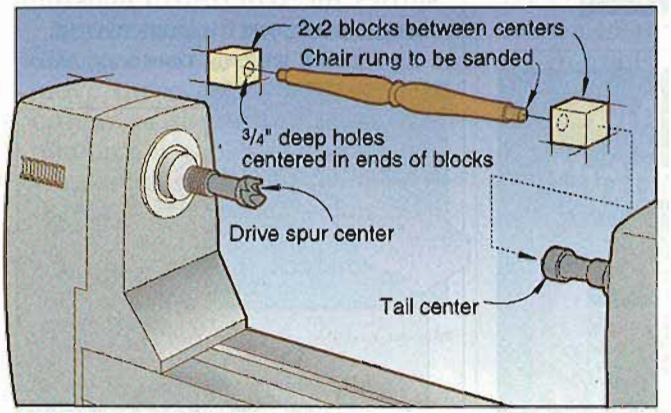
And give yourself some breathing room.

Continued from page 30

Mounting blocks hold chair spindles in lathe

When I refinished some spindle-backed chairs, I had a tough time sanding the intricate spindles. I tried mounting them in a lathe, but the tenons were too small for the drive center to grip. To solve the problem, I cut two 2x2x2" scrapwood blocks and drilled a centered hole in one end of each to match the tenon. I fit the blocks onto the spindle ends, then put the assembly in the lathe and sanded the spindles smooth in no time.

—Michael Hall, Bedford, Ind.

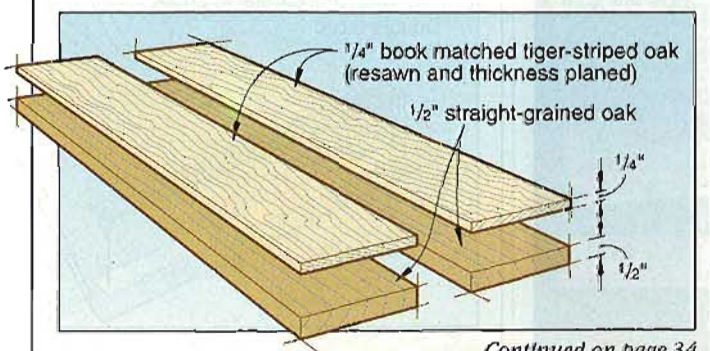

2x2 blocks between centers
Chair rung to be sanded
3/4" deep holes centered in ends of blocks
Drive spur center
Tail center

Get twice the stock without paying double

I recently built a project that featured a 10"-wide panel prominently on its front. I wanted to make the panel from quartersawn white oak that had pronounced tiger striping. The problem was I only had two 3"-wide boards with the type of figure I was looking for.

I quickly solved this dilemma by resawing each board, yielding four pieces 3" wide. Then, I ran these pieces through the thickness planer to remove the resaw marks, and laminated them to ½" unfigured white oak. I jointed the edges of these laminated pieces, then edge-glued them into a panel. Since the book-matched face grain shows and the plain-grained back doesn't, the trade-off was well worth it.

—Chuck Hedlund, Project Builder, WOOD magazine



Continued on page 34

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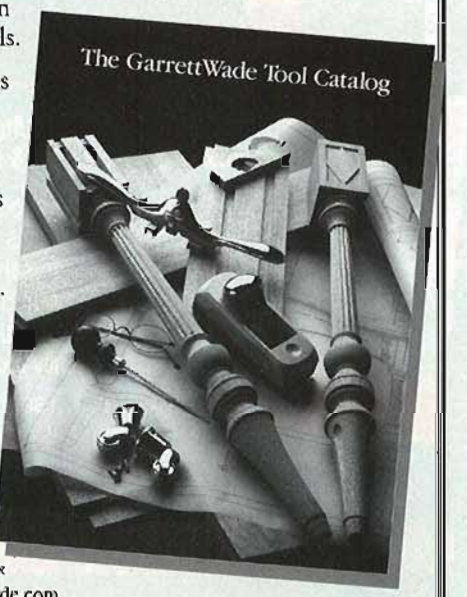

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H101

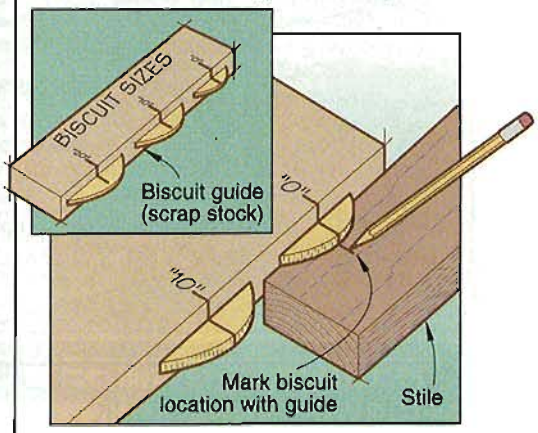
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 33

Marking guide puts biscuits in right place

I used to guess where a biscuit slot should go, but now I make sure. With my biscuit joiner, I cut slots for #0, #10, and #20 biscuits into a piece of scrapwood. Then, I mark the centerline on some matching biscuits and glued them into the slots, as shown *below*. Now I have a handy guide that shows me where to cut when there's no room for guesswork.

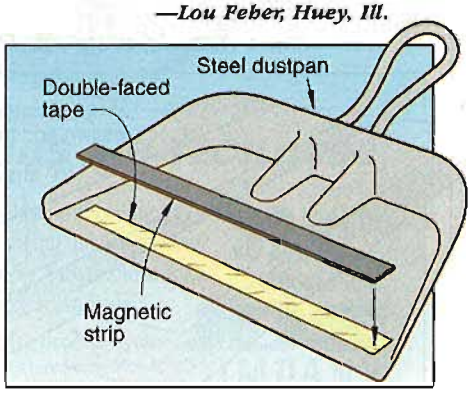
—David Whiting, Townsend, Mass.



Dustpan magnet retrieves lost hardware

I don't know how many times I've dropped brads, tacks, and small screws on the floor of my workshop, where they disappear into a pile of sawdust or wood shavings. Finally, I attached a strip of magnetic tape near the front edge of my dustpan. Now, I sweep up the sawdust, shake it into the wastebasket, and the lost items collect on the magnetic tape.

—Lou Feber, Huey, Ill.



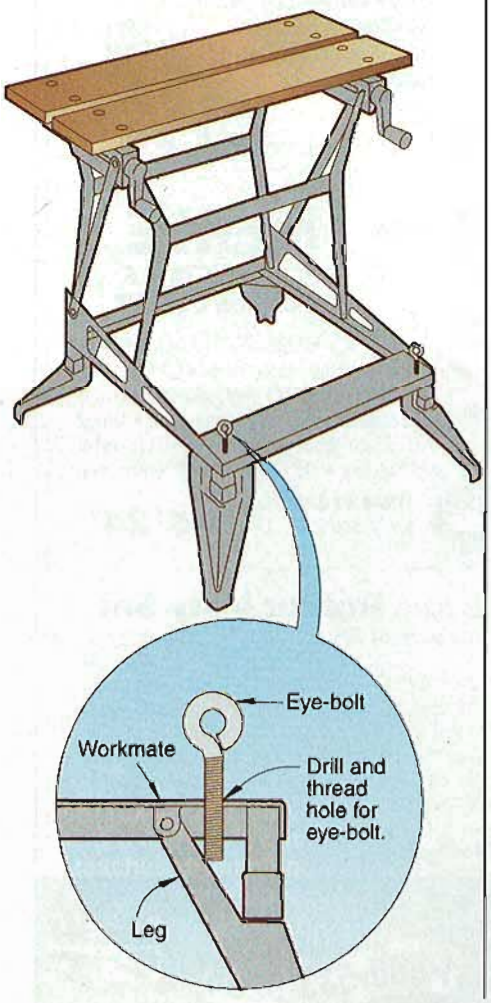
Wobble-free Workmate

To make my older model Workmate stand firm on uneven surfaces, I added leveling bolts to the folding legs. Using eyebolts—like giant thumbscrews—allows me to turn the bolts by hand to raise or lower the legs to level it.

First, I drilled and tapped a 5/16" bolt hole through the upper leg frame, directly above the edge of the folding leg, as shown. Then, I installed 5/16×1 1/2" eyebolts.

Newer models have one layer of thinner steel, so you may need to move the eyebolts closer to the corner of the upper frame and reinforce it on the underside with a square nut. The nut fits into the corner of the frame, which keeps the nut from turning when you adjust the eyebolt.

—Gordon Paterson, Scarborough, Ont., Canada

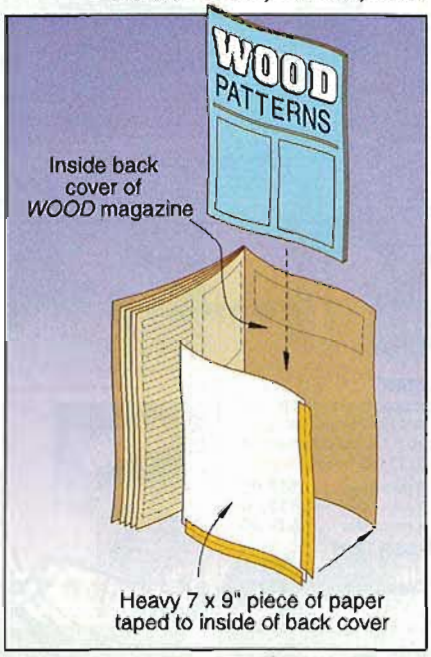


Add pocket to keep patterns handy

I love the *WOOD PATTERNS®* in the center of the magazine. But to use them, you have to tear them out and they often become separated from the magazine. Then, when I want to build another project from that issue, the plans are missing in action.

I solved this problem by adding a pocket inside the back cover, as shown in the illustration *below.* When I finish with the plans, they go right into the pocket so I'm ready for the next project.

—Gerald Koebler, Littleton, Colo.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- On *page 82* learn how to allow for wood movement when attaching a solid wood top to a plywood carcase.
- A Minnesota builder shares his formula for successfully cleaning exterior wood prior to finishing. See *page 61.*
- Can't afford real ebony? Then try the next best thing: ebonizing as shown on *page 18.*
- Learn some tips on *page 68* to help you see better in your shop as you get older.

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*Ball bearing included

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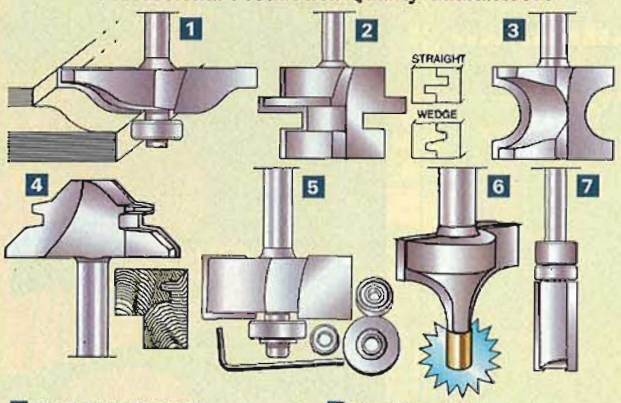

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2" Dia., Stock thickness: 1/2"-3/4" ..**$37.50**

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Ball bearing guides allow 4 depth of cuts: 3/8", 7/16", 5/16", 1/4". Set: 1/4" shank rabbeting bit, 4 bearings (3/8", 1/2", 5/8", 3/4") & hex key.
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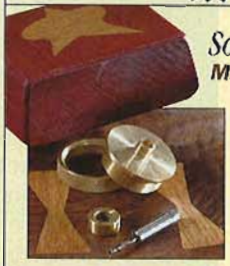

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Drums Along the ROCKIES

In her Colorado workshop, self-taught woodworker Raven Tekwe creates drums that sound an ancestral beat.

Continued

Raven Tekwe not only builds drums to sell, but also teaches drumming and plays in a drum group. She made the large Native American ceremonial drum at *right*, for performances.

Drums Along the Rockies

(Note: Photos not to scale.)

Raven builds djembes, *left center*, with their two-part bodies in two sizes, one with a 13" head and one with a 14" head. The largest has a $400 price tag.

Squeezing the tension-ing cords of this talking drum, *left*, raises its pitch. With the beater, it's priced at $325.

The 27" tall ashiko drum, *far left*, has a 13" tunable head of goatskin and sells for $300.

"Every culture in the world has or did have drums," says Raven Tekwe (Tu-kay) as she talks about her favorite instrument. "Drums have been used to celebrate, communicate, and even contemplate. Today there's a renewed interest in Native American ways, and drums are a part of it. So, too, are the West African drums and the South American congas introduced to the percussion sections of mainstream music groups to play the new wave of world music."

The newfound drumbeat also draws buyers to Raven's booth at music festivals and art fairs. "The expression of rhythm that drums provide has people really going back to their roots, ancient roots," observes the 33-year-old woodworker who calls Boulder, Colorado, home. "They come from every walk of life. I've sold drums to doctors, lawyers, and yes, even the proverbial Indian chief!"

There's more to a drum than the beat

The drum wasn't unknown in Raven's family as she grew up in Michigan. Her Native American mother is of the Ojibwa tribe, and Jamina, her grandmother, was especially influential, telling her the old stories and traditional ceremonies of her native people.

"I started by making simple, Native American drums that you hold in your hand and play with a beater," Raven recalls. "They were just a fancier version of what my ancestors did. But I started playing, too, and as I got more into it, I started playing African drums, which I focus on now."

Her first efforts at the larger, more complicated African instruments were on ashikos, shown *above left*. They are lightweight, one-piece drums (25-27" tall with a head 13" in diameter) that produce great volume for their size.

"But I really knew nothing about the woodworking necessary to make one—or anything else. There were no books on drum making, so I started out with help from woodworking magazines and books, and lots of trial and error," she laughs.

"Usually, when ashikos are from Africa, they're carved out of a chunk of log. I knew that at my size I didn't have the physical strength to make them from logs, so I decided to build them with the stave technique I saw done step-by-step in a magazine," Raven recalls. "I bought a tablesaw and a jointer, then added a router. It was hard learning how to rip and machine wood properly by myself. And there was a lot of waste. But as I learned, I discovered what it took to make a drum sound real good, too."

As Raven built drums, she bought more tools that could make an operation better or easier, such as her lathe. Before that she did a lot of sanding to round her drums.

Eventually, she picked up enough woodworking experience to move to another level of drum making—the greatly resonant, two-piece bass drums called djembes (jem-bay), *above center*. Raven also began building the smaller "talking drums" of Ghana, shown *above right*, known for their infinite variety of pitches and lyrical quality.

A musical marriage of wood and hide

"Pick up a djembe imported from Africa; it can weigh 20-30 pounds. My drums weigh about seven. If you're wearing a drum and playing it all day," she explains, "there's a huge weight difference between one made from tropical wood and mine of willow."

The wood used for a drum body does affect its resonance," Raven notes. "The harder the wood, the greater crispness and clarity the drum has. Willow is a hardwood; hard enough to produce nice sound, yet light enough to be comfortable carrying it. And I've found that willow is not only easy to work, but straight-grained and beautifully colored. Every batch of willow that I

buy has so much color variation that each of my drums looks different."

In a drum, the body delivers the resonance of a beat, but it's the head where the sound originates. "The drums I mostly make—the ashikos and the djembes—aren't played with beaters. They're played with taps or slaps of the hand; skin against skin," says Raven, exhibiting the technique with a few resounding taps. "For these West African drums, I use goatskin because it's traditional. I buy them, already cut in circles, $500 worth at a time. And I use two different kinds: One has the hair still on one side, the other is completely cleaned. For those people who don't like the hair, I scrape the tops and leave it on the sides.

"For heads of large ritual drums, the kind used for performances, I prefer the tanned hides of elk, buffalo, or cow," the drum maker continues. "I like cow because the skins tend to be bigger—from a whole cowskin I can make a drum 5' in diameter. And the specially processed cowskins I buy still retain much of their natural oils to provide better sound."

Staved stems of willow begin at the tablesaw

In her drum-making nomenclature, Raven calls the body of a drum the stem. And she builds them from staves she cuts—with the help of a jig—at the tablesaw.

First, though, she calculates the angle of the taper for the size of the drum she wants to build. A small, simple drum may have from 12 to 16 staves, each perfectly tapered and beveled for joining into a stem. To figure the taper of the staves, Raven multiplies the top diameter by pi (3.14), then divides the product by the number of staves. This gives her the width of the top of each stave. To arrive at the bottom width of the staves, she repeats the process with the base dimension.

Using a commercial tapering jig, Raven fashions a master stave that she'll rely on to make all of the drum staves. To it, she adds a shop-made handle so that it can act as a hold-down. With her tablesaw blade set at the bevel angle for the staves (cut angle=180° divided by number of staves), she begins ripping.

At the tablesaw, the stave being cut rides inside the blade. For each following stave, she flips the stock end for end after the first beveling rip cut, a process continued until enough staves have been made.

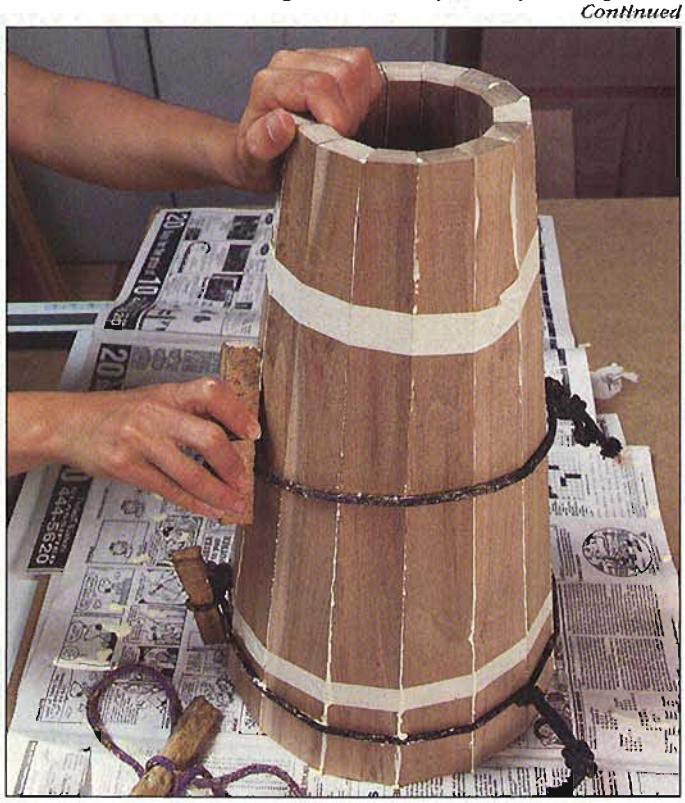
Drums that withstand a crash test

To check the fit of the staves in the drum's stem, Raven lays them out on the workbench atop two strips of masking tape. Then, she stands them into a round drum shape. If necessary, she removes high spots with a hand chisel or sandpaper. When satisfied with the fit, she lays them down again in position for gluing, as in the photo *below left*.

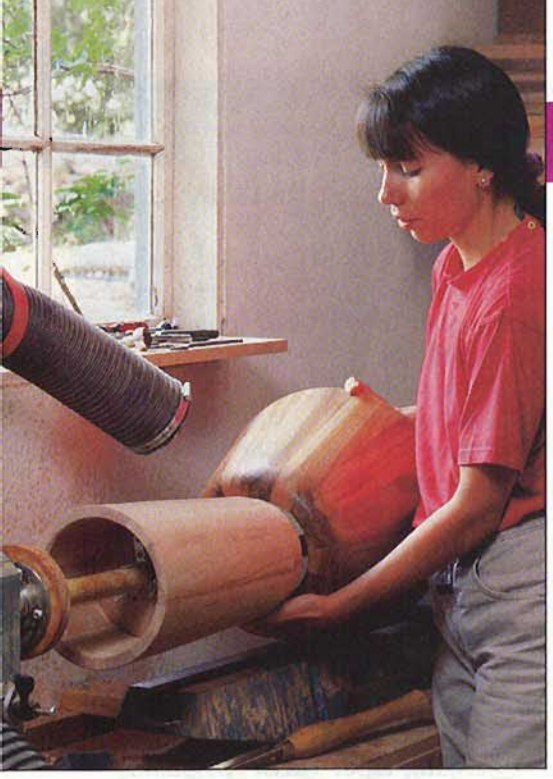
"I use regular Titebond because the working time seems about right," she says. "My clamps are

Continued

After laying out the staves in fan fashion, the drum maker applies glue to the mating edges with a brush.



Simple band clamps made of leftover mountain-climbing cord hold the stem staves together as the glue dries.



After turning a djembe's stave stem to round on the lathe, Raven checks the fit of the head section. Note the shop-built jam chucks that fit inside.

nothing but pieces of scrap cord fitted with rough wooden handles that I can twist. Believe me, tight joints are important because a drum should take some abuse. Like one customer of mine—she brought in a drum that had been run over by a van at a festival."

Raven pauses to stifle a snicker. "The drum was flat as a pancake but there wasn't a broken joint!"

After the drum stem has thoroughly dried, the drum maker moves it to her lathe. Plywood discs cut to the inside diameters of the top and bottom serve as jam chucks to hold the stem between centers (see photo *left*) while she rounds it with a gouge. "For a long time, I knocked down the ridges with a portable sander. But the lathe speeds things up," she comments.

Metal rings with decorative twine provide sturdy, binding anchors for the low-stretch nylon cord Raven uses to tension the drumhead.

Turned round, then sanded on the lathe, the drum stem is nearly ready for finishing. "But first I have to round over the staves on the head end [top] with my router, then sand down the round-over," says Raven. "Then, I can apply sanding sealer, followed by a final sanding. After that, I put on three coats of tung oil outside and one inside, and it's ready to be headed."

Tight drumheads build better beats

Raven claims that the most important thing about a drumhead made of animal skin is its tightness. And that tightness begins with the installation or "heading" of the drum.

"If they're thick, such as cow, I soak them in water overnight until they're squishy. A thin head of goatskin, though, only takes about an hour in water to make it soft enough to work," she says. "In use, the skin heads do absorb moisture from the air. So on a humid day a drum that you can't tighten, such as a Native American one, will go flat [in sound]. In fact, native people would stand around the campfire to heat their drumheads up before playing, or to retighten them. Today, it's a littler safer to use hair dryers," she quips. "On African drums, you can adjust the head tension by the cords—some people like the higher sound of a tighter drumhead anyway."

To get and keep the tunable ashiko and djembe drumheads tight, Raven relies on a roping system that keeps tension on the skin as she laces it down with mountaineers climbing cord, *left*. "That cord will take all the pressure necessary to keep the head taut," she notes. "And if I make a mistake lacing, I quote the Navajo rugmakers of the Southwest. I'm told that they purposely weave a mistake into every one of their pieces, then say 'Only God can make things perfect.' "

Build a simple ashiko-style drum

To help others get started in the pleasures of drumming—and building drums—Raven collaborated with *WOOD*® magazine's design editor Jim Downing to get double duty from one of his projects. To build a small, nontunable ashiko-style drum like the one shown *above right*, turn to the "16-Sided Showpiece" staved-vase project on *page 70*.

Follow the same step-by-step process used for cutting and assembling the staves for the vase. For the drum, though, cut the staves to 11⅞" long, then trim them to 11¾" when you bevel the small end. Also omit the bottom dadoes and the bottom, as well as the ebony inlays. (We used walnut for our drum, but you can use any hardwood.) Round the outside of the drum with a random-orbit sander or at the lathe using jam chucks as Raven does.

However, in order to achieve a smooth-fitting, tight drumhead, you'll have to roundover the outside edges of the staves at the top of the drum. Do this with a ½" round-over bit in your router. Then, sand the stem smooth on the outside and apply a clear finish (Watco Danish Oil was our choice).

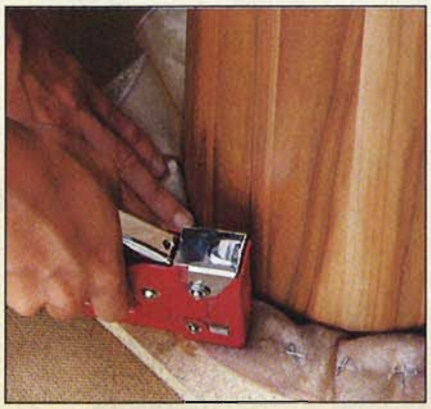
How to head your drum

To head the drum (see the Buying Guide for materials), first make a simple heading jig, as shown in the photo *right*. Then, submerge the goatskin head in lukewarm water for at least an hour. The skin will become soft and pliable.

Determine which is the outside of the skin. It should be the smoother side, perhaps with traces of hair. Even if you guess wrong, the drum will sound fine, according to Raven. Place the pliable skin top side down inside the hole in the top section of the jig. Center the skin, then place the drum stem top side down into the hole and on top of the skin.

With a staple gun, begin stapling the skin to the jig in a circle about ½" from the stem. Space the staples about 1" apart and cross them, as shown in the photo below.

When you've stapled completely around the skin, remove the stem and apply a generous bead of glue around the top (we used hide glue so that the skin could be replaced if broken). Now, place the stapled skin and jig section on top of the stem, and thread the four rods through the holes in the top and bottom section. Use the wing nuts to begin tightening the jig. Move quickly around the head because the skin and glue are both starting to dry. At the point when the staples look as if they will rip through the skin, stop tightening and set aside the assembly to dry overnight. Resist the temptation to tap on it!



Cross-staple the goatskin to the jig's top section all the way around.

After the drumhead has completely dried, undo the jig and pull the staples. With a crafts knife, trim away the excess skin about 1½" down from the drumhead. Install the decorative nylon trim over the edge of the skin with upholstery tacks. Now, celebrate with a peppy beat!

Buying Guide

Drumhead, trim, and hardware. One 12"-diameter goatskin head, 2' nylon webbing, decorative upholstery tacks, $29.95 (US), ppd. in U.S. Wings of the Heron Drums, P.O. Box 18171, Boulder, CO 80308.

Stretching it tight-as-a-drum

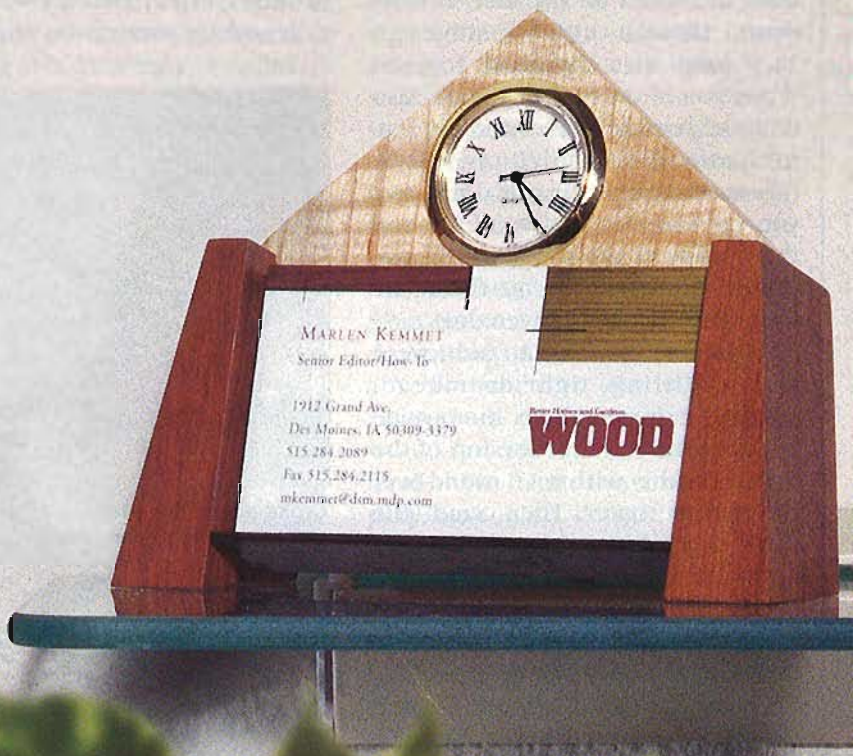
Goatskin head stapled to bottom side of jig top
Wing nuts and flat washers to tighten head
¾" plywood with center hole cut about ⅛" larger to fit snugly over top of drum stem and goatskin
¼" all-thread rods with flat washers and nuts on bottom side

Building this simple jig makes heading the drum an easy job.

Written by Peter J. Stephano Photographs: Tim Murphy/Foto Imagery

Two Time Winners

Take advantage of a beautiful piece of wood with either the clever pendulum clock or business-card desk clock. The pendulum features the rich dark lines of cocobolo in combination with a contrasting maple clock ring. The other clock touts figured maple, red heart, and wenge.



Very Moving Pendulum Clock

Start with the pendulum clock body and ring

1 Cut a ½"-thick piece of highly figured stock to ½×3×12" for the clock body (A) and bob (B). (We used cocobolo. See the Buying Guide for our source.)

2 Cut the full-sized pattern (A, B) from the *WOOD PATTERNS®* insert in the center of the magazine, and adhere it to the ½" stock.

3 Drill the two holes through the clock body where marked on the pattern. Then, bandsaw and sand the two pieces to shape.

4 Cut a pair of ⅛" grooves ⅛" deep along the back side of the body (A) to house the sides (G) later.

5 Transfer the full-sized pattern for the clock ring (C) to ¼" maple stock. Drill the holes where marked, then cut the ring to shape. Next, drill the hole, and cut the spacer (D) to shape from 3/16" cocobolo.

Use dowels for the hour marks

1 Sand a slight chamfer on the end of one piece of ⅜" dowel stock and on one end of three pieces of ¼" dowel stock. Cut the ⅜" dowel to 7/16" long and cut each of the three pieces of ¼" dowel to 5/16" long. Using the ebonizing article on *page 18* for reference, ebonize the four pieces of dowel stock.

2 Glue the four pieces of dowel stock (E, F) in place in the clock ring (C) so they protrude about 1/16" on the front surface of the clock ring. The ⅜" dowel (F) should protrude ⅛" out the back edge of the ring.

3 Place a small amount of glue on the back face of the clock ring (C), but only where it will contact the clock body (A). Glue and clamp the clock ring (C) to the front of the clock body, inserting the protruding back end of the ⅜" dowel (F) into the ⅜" hole in the clock body. Align the ring carefully on the clock body so the 6 o'clock dowel is directly below the 12 o'clock dowel.

Add the rest of the pieces, and assemble

1 Transfer the side patterns (G) from the pattern insert to ⅛" stock, and cut the two sides to shape. Ebonize the sidepieces.

Continued

Pendulum Clock Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A* body	½"	3"	10 1/16"	C	1
B* bob	½"	3"	1⅛"	C	1
C ring	¼"	4½" diam.		M	1
D spacer	3/16"	¾" diam.		C	1
E* mark	⅜" diam.		7/16"	D	1
F* marks	¼" diam.		5/16"	D	3
G sides	⅛"	1¼"	9 9/16"	M	2
H* bob block	7/16"	¾"	¾"	C	1

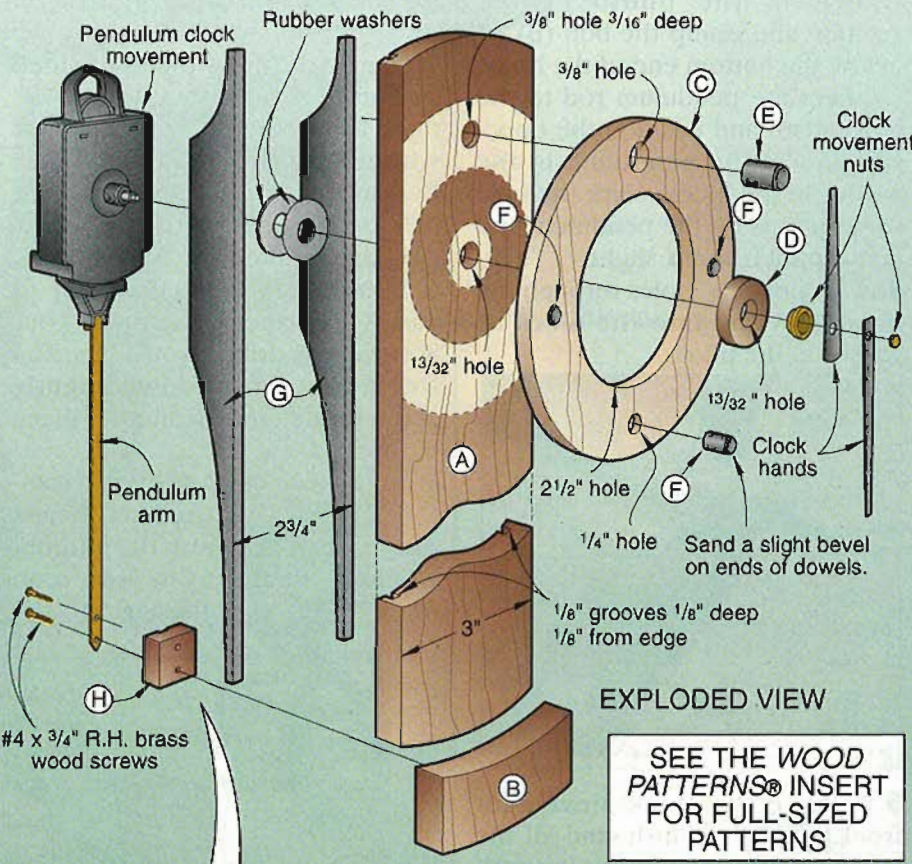
*Initially cut parts oversized. Then, trim each to finished size according to the how-to instructions.

Materials Key: C–cocobolo, M–maple, D-dowel

Supplies: 2–#4×¾" roundhead brass wood screws, clear finish.

Buying Guide

Clock movement. One clock movement for $19.95 (#200450), five for $82.95. For enough cocobolo and maple to make one clock, add $12.95. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247 or call 800/346-9663 or 319/656-2374 to order.



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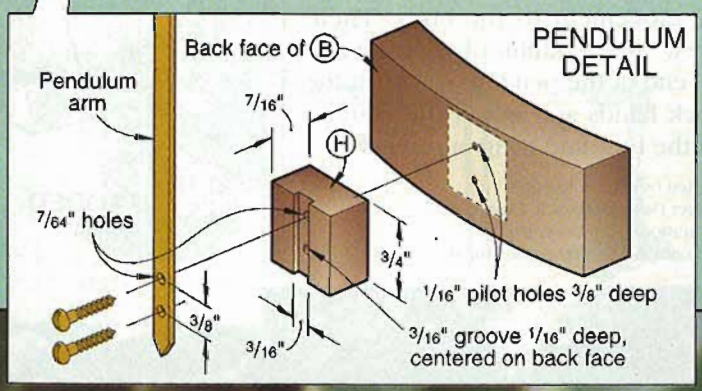


Pendulum Clock

2 Glue and lightly clamp the sidepieces (G) into the grooves on the back side of the clock body (A).

3 Cut a piece of 7/16" stock to 3/4" wide by 6" long for the pendulum bob block (H). Cut a 3/16" groove 1/16" deep, centered in the stock. Crosscut the bob block to length from the grooved blank. Glue the block to the back side of the bob (B). See the Pendulum detail for reference.

4 Connect the clock movement to the clock body (A). Lay the clock body facedown on scrap blocks as shown in the photo *below*. Position and clamp the bob (B) 1/8" below the bottom end of the body. Connect the pendulum rod to the movement, and position the opposite end of the pendulum in the groove in the block. Mark the hole centerpoints on the pendulum and centerpunch them slightly. Then, drill a pair of 7/64" holes through the pendulum and into the block as shown in the photo.

5 Remove the clock movement from the body. Finish-sand all the pieces and add the finish. Reattach the movement to the body. Then, screw the pendulum bob/spacer to the end of the pendulum. Attach the clock hands and install the battery. Set the time and hang in place.

Written by Marlen Kemmet
Project Design: James R. Downing
Illustrations: Kim Downing
Photographs: Hetherington Studio

Strictly Business

Desk Clock

Keep time and your business cards at the same handy location with this sharp contemporary desktop addition.

Note: *We sized our holder to accommodate business cards measuring 2×3½". If your cards are a different size, you'll need to change the holder size accordingly.*

1 Plane a 12"-long piece of stock (we used figured maple) to 7/16" thick for part A. (It's safer to start with a long piece for planing.)

2 Transfer the pattern for part A (it's on *page 100*) to the stock. Drill the counterbore for the clock movement, and then cut the top of part A to shape. If the tip of your Forstner bit drills through the 7/16" stock, file the tip down slightly and repeat step 1 on another piece of stock.

3 Cut a piece of 3/4" stock to 1 3/8×8" for parts B. (We used red heart, but cardinal wood or padauk would work also.) Cut a dado on the inside face of this strip to the same width as the thickness of part A. Adhere the paper patterns, and make the cuts to get two B's from the 8"-long strip. (We bandsawed the outside surfaces and miter-cut the bottom ends where shown on the Side View drawing on *page 100*.)

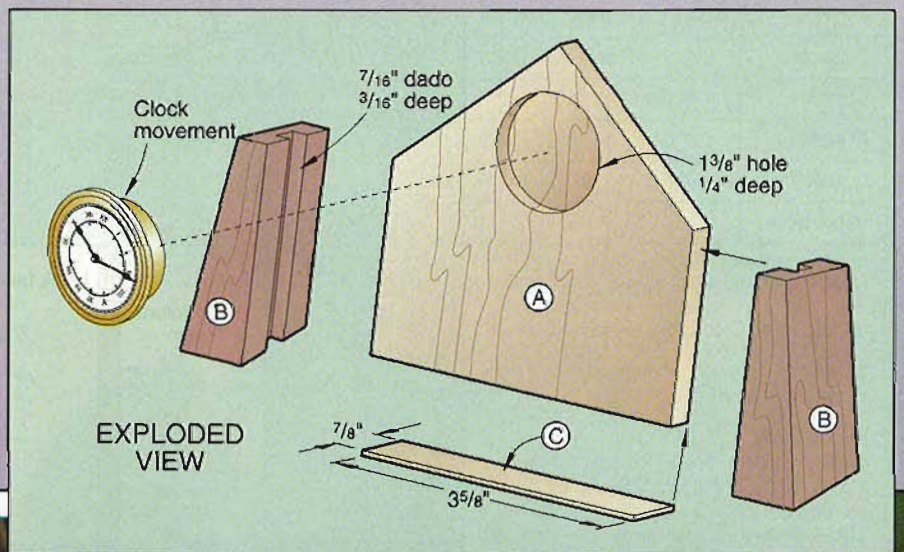
4 To form part C, plane or resaw stock (we used wenge) to 1/16" thick, and then cut part C to size.

5 Glue and clamp the clock together in the configuration shown on the Exploded View drawing. To bring out the beauty of the wood, we used an oil finish.

Buying Guide

Clock movement. One clock movement for $10.95 (#200113), or five for $49.95. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247 or call 800/346-9663 or 319/656-2374 to order.

Project Design: Schlabaugh and Sons, Kalona, IA
Illustrations: Roxanne LeMoine
Photographs: Hetherington Studio



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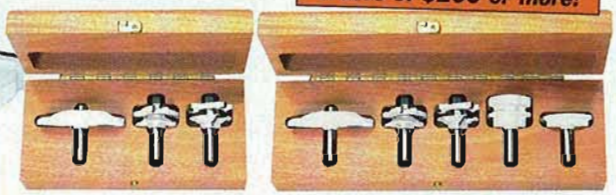

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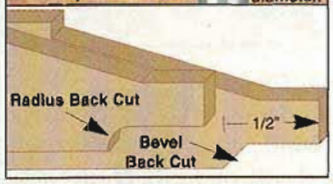

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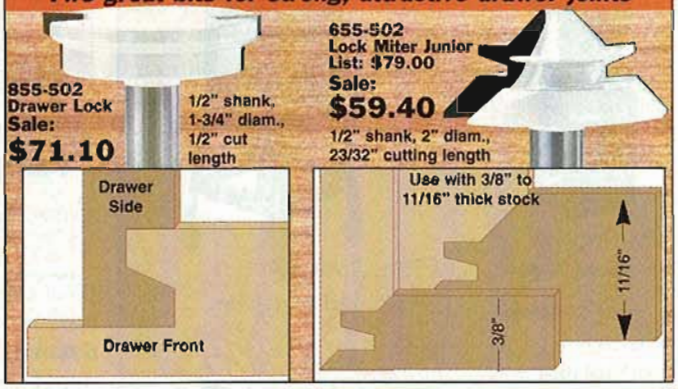

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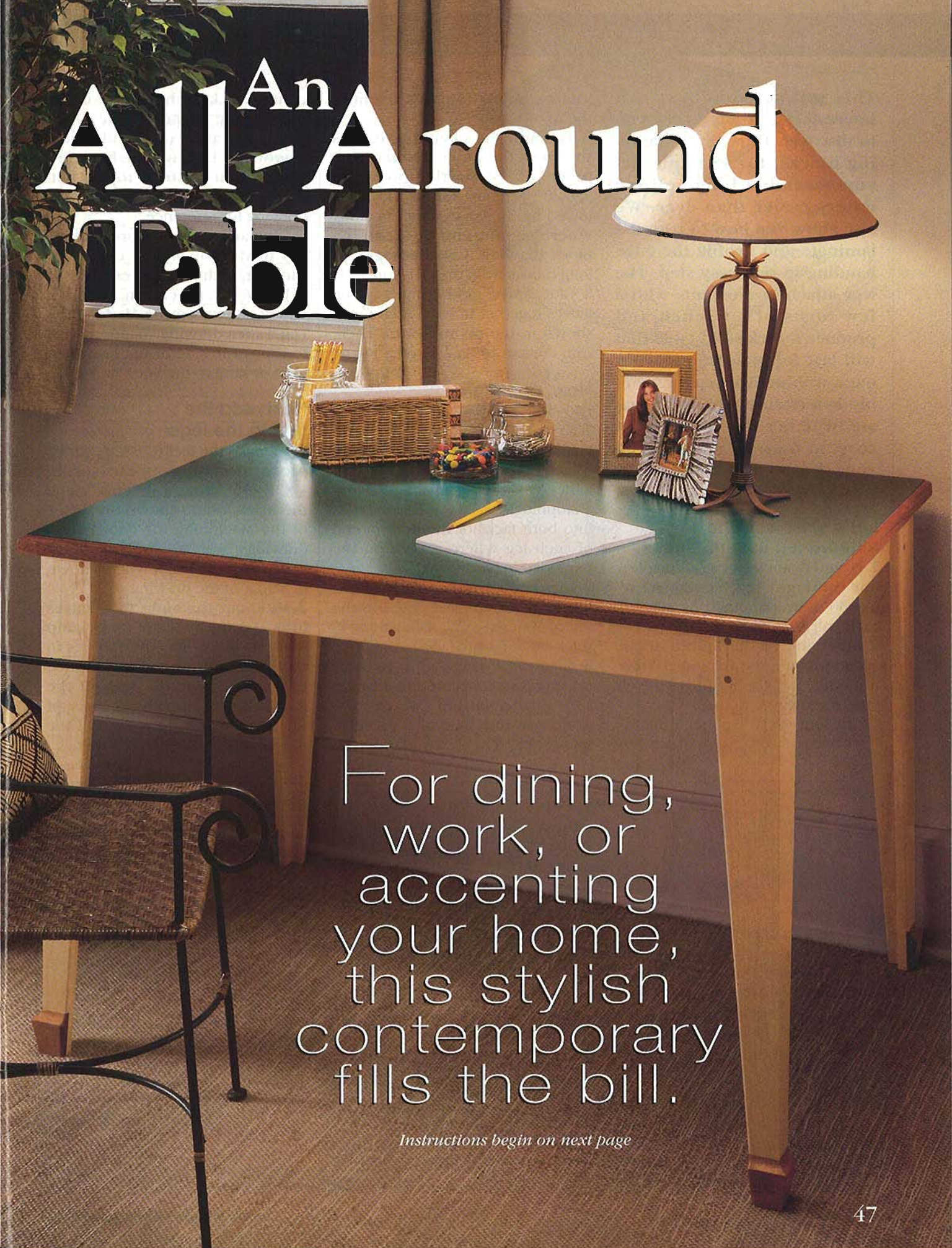
An All-Around Table



For dining, work, or accenting your home, this stylish contemporary fills the bill.

Instructions begin on next page

All-Around Table

This project abounds with interesting techniques for you to discover. Our clever clamping blocks, for example, let you assemble long splined miters easier than ever. We also show you how to trim the laminate and profile the edge banding in one easy step. The legs attach in moments with a few turns of a wrench and produce a rock-solid table that will last for generations without a wobble. This easy assembly is a feature you'll appreciate, whether the table travels coast to coast or simply from your shop to the kitchen.

Let's start with the mitered leg assemblies

1 From ¾" stock (we used maple), cut the eight leg halves (A) to 3½×30", bevel-ripping one edge of each half at 45°.

2 Referring to the Spline detail accompanying the Exploded View drawing, cut the spline grooves where shown.

3 Cut four ⅜×30" splines from ⅛" hardboard. Dry-clamp two leg halves together to check the fit of the splines.

4 To form the clamping blocks shown in the photo *below*, cut a piece of ¾" particleboard to 3½×20". Machine the V-groove followed by the large rabbet in stock where shown on the Clamping Block drawing. Crosscut eight 2"-long blocks from the 20" strip.

5 Glue, spline, and clamp two leg halves together to form each leg as shown in the photo *below*. Then, trim the legs to final length.

Now, complete the leg assemblies

1 Fit your tablesaw with a ¾" dado head, and set it to cut 3/16" deep. Attach a wooden extension to your tablesaw's miter gauge, and clamp a stopblock to it. Cut 2½" rabbets into both faces of the bottom end of each leg where shown on the Exploded View drawing.

2 Rip and crosscut the corner blocks (B) to the size listed in the Bill of Materials. (We laminated ¾"-thick stock face-to-face.)

3 Clamp a V-groove jig to your drill-press table, centering it under a 5/16" brad-point bit. (We cut a V-groove in one face of a piece of 2×4 stock. Then, we placed the corner block in the groove in the 2×4 so one corner of the block pointed straight up.) Drill a hole diagonally through each corner block, centered from top to bottom. See the Corner Section View drawing for reference.

4 Glue and clamp a corner block (B) to the top inside corner of each leg, with their top ends flush.

5 Draw the tapers on each leg where shown on the Marking the Leg Taper drawing. Bandsaw just to the waste side of the line, then joint or sand to the line.

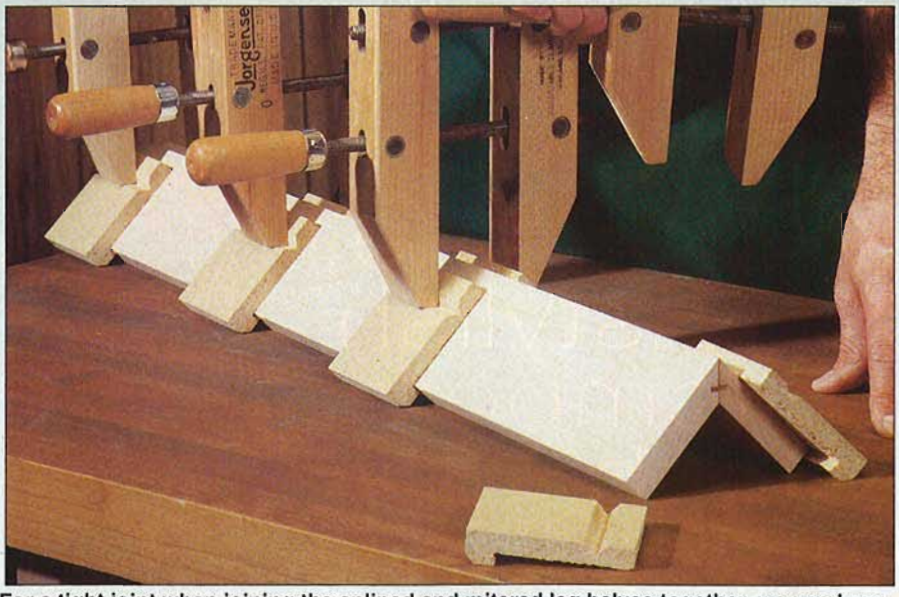
Next, add the feet to the legs

1 To make the feet (C), start with a piece of mahogany measuring ¾×2½×36". Rout a ½" cove along the blank where shown on *Step 1* of the Machining the Foot Halves drawings.

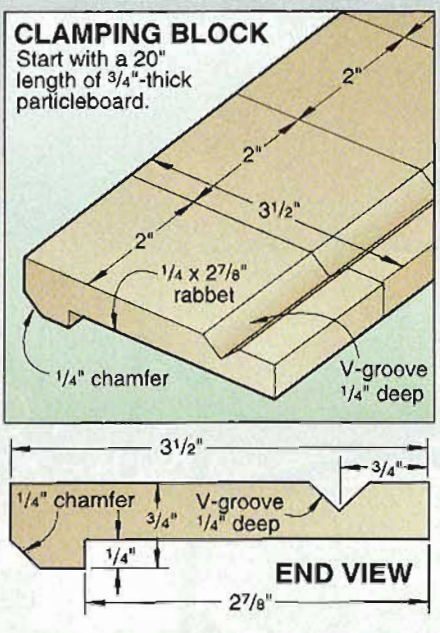
2 Bevel-rip the blank where shown in *Step 2* of the drawing.

3 Miter-cut the eight foot halves into 3" lengths. Glue and clamp them in place into the rabbets in the legs. Later, use a fine-toothed backsaw to trim the ends of the foot halves flush with the taper of the leg. Hand-sand the ends of the foot halves flush with the taper.

Continued



For a tight joint when joining the splined and mitered leg halves together, we used our handscrew clamps and shop-built clamping blocks.



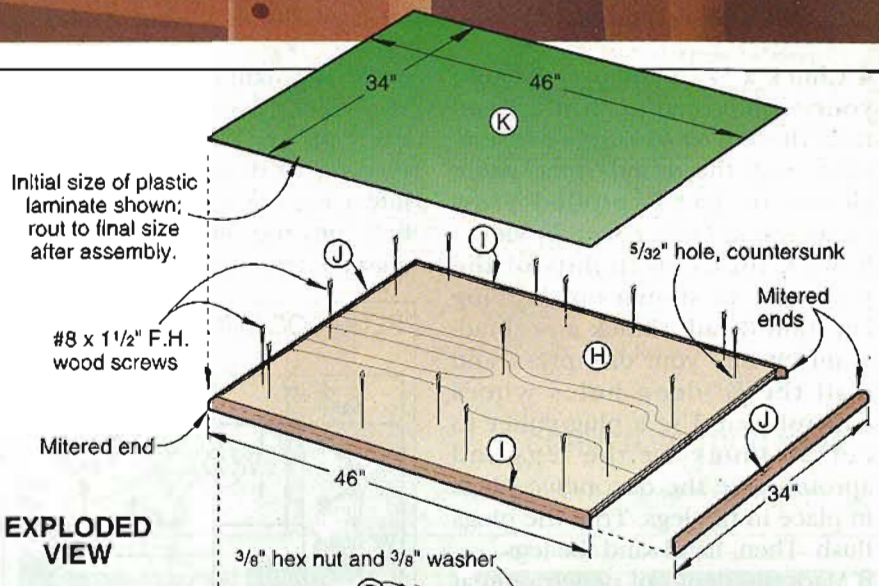
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
BASE					
A* leg halves	¾"	3½"	29¼"	M	8
B corner blocks	1½"	1½"	4"	LM	4
C* feet	¾"	2½"	2¼"	MH	8
D side aprons	¾"	3½"	39½"	M	2
E end aprons	¾"	3½"	27½"	M	2
F corner braces	¾"	3½"	4¾"	M	4
G* center brace	¾"	3½"	29¼"	M	1
TABLETOP					
H top panel	¾"	32½"	44½"	PW	1
I* banding	¾"	1"	46"	MH	2
J* banding	¾"	1"	34"	MH	2
K* top surface	⅛"	34"	46"	PL	1

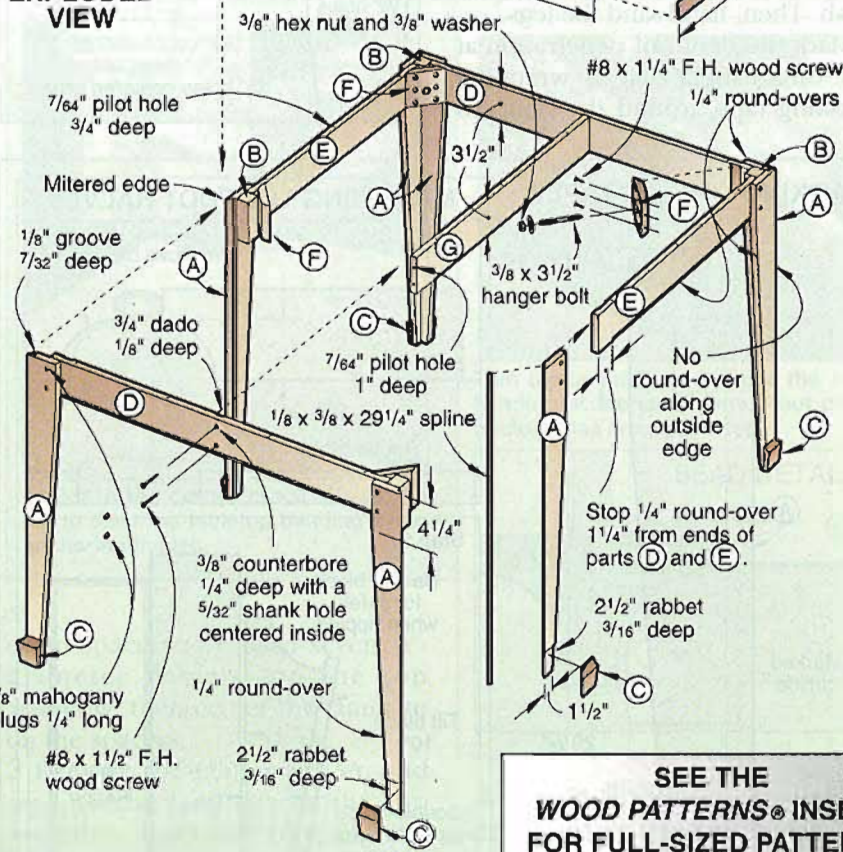
*Initially cut parts oversized. Then, trim each to finished size according to the how-to instructions.

Materials Key: M–maple, LM–laminated maple, MH–mahogany, PW–plywood, PL–plastic laminate

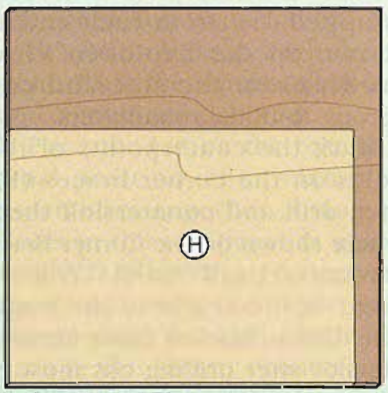
Supplies: ⅛" tempered hardboard for splines, 4–⅜x3½" hanger bolts, 4–⅜" flat washers, 4–⅜" hex nuts, 24–#8x1¼" flathead wood screws, 21–#8x1½" flathead wood screws, contact cement, wood putty, clear finish.



EXPLODED VIEW

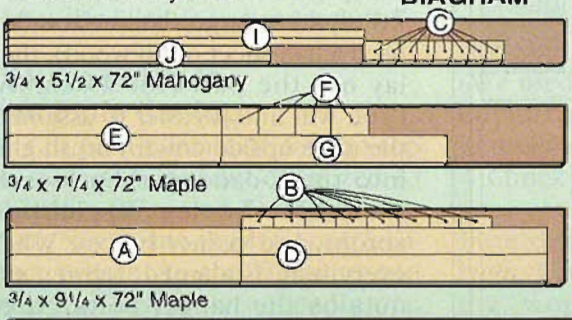

3/8" hex nut and 3/8" washer
#8 x 1 1/4" F.H. wood screw
1/4" round-overs
7/64" pilot hole 3/4" deep
Mitered edge
3 1/2"
1/8" groove 7/32" deep
3/8 x 3 1/2" hanger bolt
3/4" dado 1/8" deep
7/64" pilot hole 1" deep
No round-over along outside edge
1/8 x 3/8 x 29 1/4" spline
Stop 1/4" round-over 1 1/4" from ends of parts D and E.
4 1/4"
3/8" counterbore 1/4" deep with a 5/32" shank hole centered inside
2 1/2" rabbet 3/16" deep
1 1/2"
3/8" mahogany plugs 1/4" long
1/4" round-over
#8 x 1 1/2" F.H. wood screw
2 1/2" rabbet 3/16" deep

SEE THE *WOOD PATTERNS*® INSERT FOR FULL-SIZED PATTERNS



3/4 x 48 x 48" Plywood

CUTTING DIAGRAM



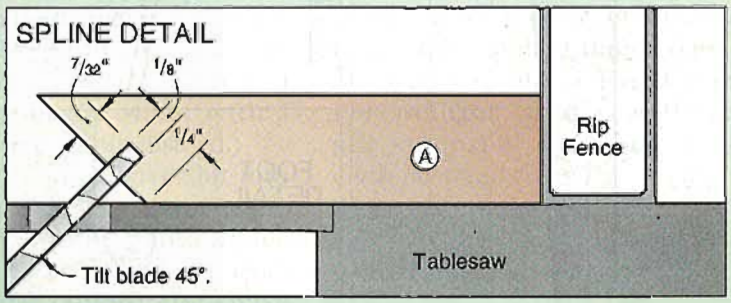
3/4 x 5 1/2 x 72" Mahogany

3/4 x 7 1/4 x 72" Maple

3/4 x 9 1/4 x 72" Maple

3/4 x 9 1/4 x 96" Maple

SPLINE DETAIL



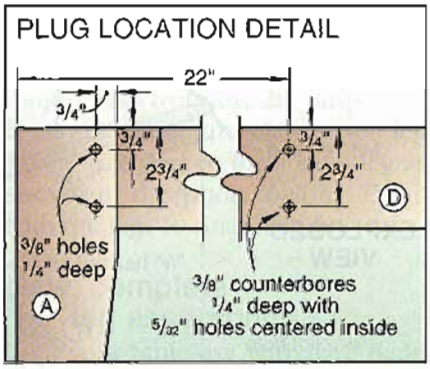
Clamping Block

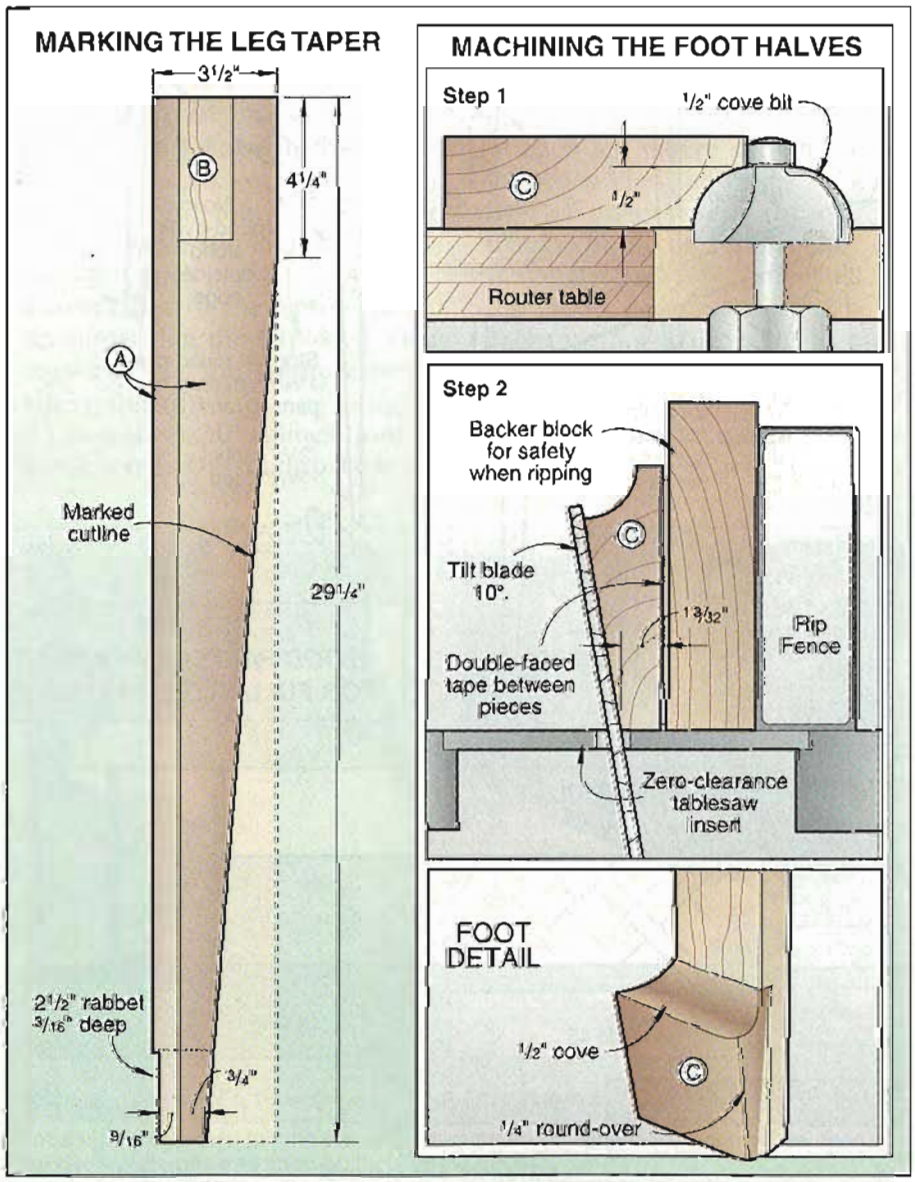
3/4 x 3 1/2 x 20" Particleboard

4 Chuck a ¼" round-over bit into your table-mounted router, and rout the edges of the leg assemblies. Stop the round-overs where shown on the Exploded View drawing and Corner Section View.

5 Mark the centerpoints of the plugs where shown on the Plug Location detail. Chuck a ⅜" brad-point bit into your drill press, and drill the ¼"-deep holes where dimensioned. Use a plug cutter to cut 20 plugs for the legs and aprons. Glue the decorative plugs in place in the legs. Trim the plugs flush. Then, hand-sand the legs.

6 Mark the depth of penetration at 1⅜" on a hanger bolt by wrapping masking tape around the bolt. To drive the hanger bolt, thread on two nuts, jamming them against each other. Then, use a socket wrench to drive the hanger bolt into each corner block. Drive the bolt into the block 1⅜" using the masking tape as a depth stop.





And now, make the table aprons and braces

1 Rip and crosscut the side and end aprons (D, E) and the corner braces (F) to size. Rip the center brace (G) to width, but do not cut it to final length yet.

2 Mount a ¾" dado set in your tablesaw, and tilt it 45°. Then, set the depth of cut to ⅜". Test this setup on scrap stock, then cut the V-dadoes in the side and end aprons (D, E) where shown in the Corner Section View drawing.

3 Lock the dado set in a vertical position, and adjust it for a ⅛"-deep cut. Cut a dado centered in the side aprons (D) where shown on the Exploded View drawing.

4 Chuck a ⅜" brad-point bit into your drill press, and drill the counterbores in the side aprons (D) centered over the dadoes cut in the previous step. Chuck a 5/32" bit into your drill press, and drill holes centered inside the counterbores.

5 Chuck a ¼" round-over bit into your table-mounted router, and clamp a fence flush with the bit's bearing. Mark start- and stop-lines on the fence for the round-overs (stopped 1¼" from each end as shown on the Exploded View drawing) on the side and end aprons. Rout the round-overs.

6 Mark the centerpoints of the holes on the corner braces (F), then drill and countersink them where shown on the Corner Brace drawing on the *WOOD PATTERNS*® insert in the center of the magazine. Use a chisel to finish forming the slot after drilling out most of the waste.

7 Prepare a large flat surface (we used a half-sheet of plywood), then lay out the parts for assembly. (You will find it easier to assemble the table upside down.) Brush glue into the V-dadoes, then loosely assemble the leg assemblies, aprons, and corner braces. When everything is aligned, tighten the nuts on the hanger bolts. Next, using the holes in the corner braces as guides, drill 7/64" pilot holes ½" deep into the apron sides

and ends. Then, drive the screws through the corner braces.

8 Cut the center brace (G) to length, checking it against the base assembly. Glue and clamp it in position. Then, using the holes in the side aprons as guides, drill 7/64" pilot holes 1" deep into the ends of the center brace. Drive the screws, then glue the mahogany plugs into place. After the glue dries, sand the plugs flush.

Next, make and attach the top assembly

1 Rip and crosscut the top panel (H) to the dimensions listed in the Bill of Materials. Rip 1"-wide strips of banding (I, J) from ¾"-thick stock. Miter-cut the ends of the parts, then glue and clamp them to the perimeter of the top panel flush with its top surface.

2 Put the top assembly facedown on your workbench, and center the upside-down base on it. Trace the outline of the aprons and center brace on the plywood to indicate where to drill holes for the screws that attach the top to the base. Remove the base, and mark the screw-hole centerpoints. Drill a 5/32" shank hole at each centerpoint. Turn the top assembly over, and countersink the holes.

3 Place the top on the base in its final position, then clamp the assemblies together. Using the holes in the top panel as guides, drill 7/64" pilot holes ¾" deep into the aprons and center brace. Drive the screws, making certain that each head is slightly countersunk.

4 Fill the holes in the top panel. After the filler dries, sand it flush.

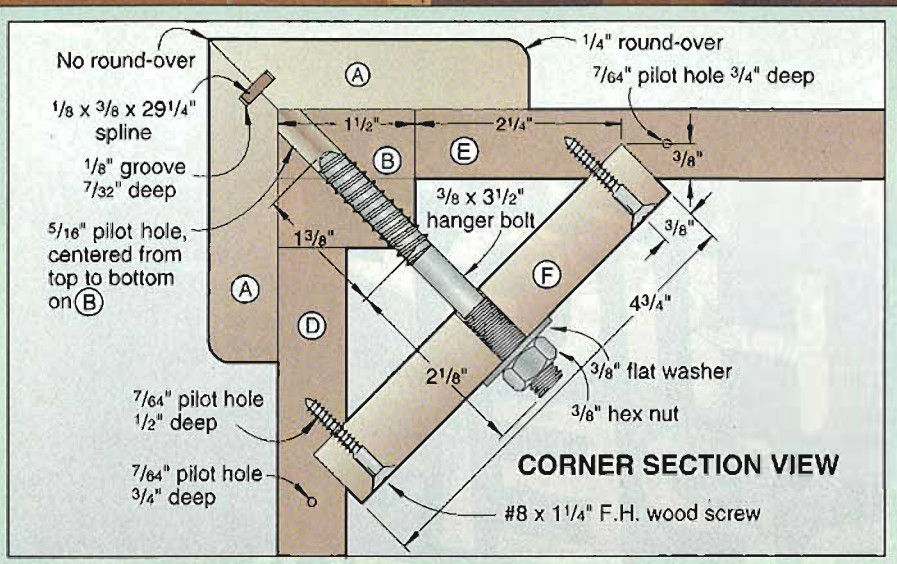
You're ready to laminate the top

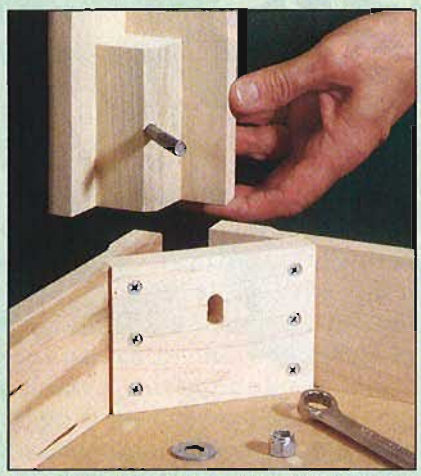
1 Cut plastic laminate for the top surface (K) initially oversized to 34×46". (We used Formica color 942, Nile, matte finish.) Apply contact cement to the laminate and the top assembly according to directions on the can.

2 When the contact cement is ready to bond the parts, place clean spacers (we used seven ½"-diameter dowels) on the top assembly, then center the laminate on the spacers.

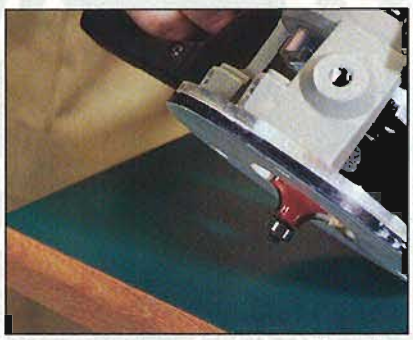
3 Remove the center spacer, and smooth the laminate to the top assembly. Continue adhering the laminate, working from the center outward by removing spacers and smoothing the laminate. Complete the bond by applying pressure. (We used a rubber J-roller, but you could roll out the sheet with a household rolling pin instead.)

4 Chuck a ⅜" round-over bit into your router where shown in the Bead detail and the photo *above right*. Rout the laminate and banding, working counterclockwise around the top. (We did this in two passes, lowering the bit the second pass.)

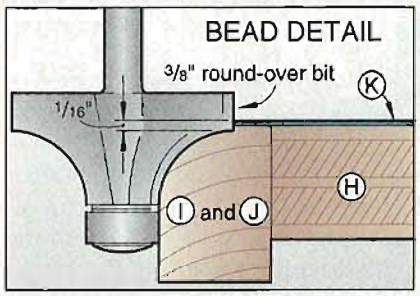




A slot in the corner brace allows the leg to clear the tabletop banding when anchoring the leg.



Trim the laminate and shape the edge banding at the same time. Rout counterclockwise around the top.

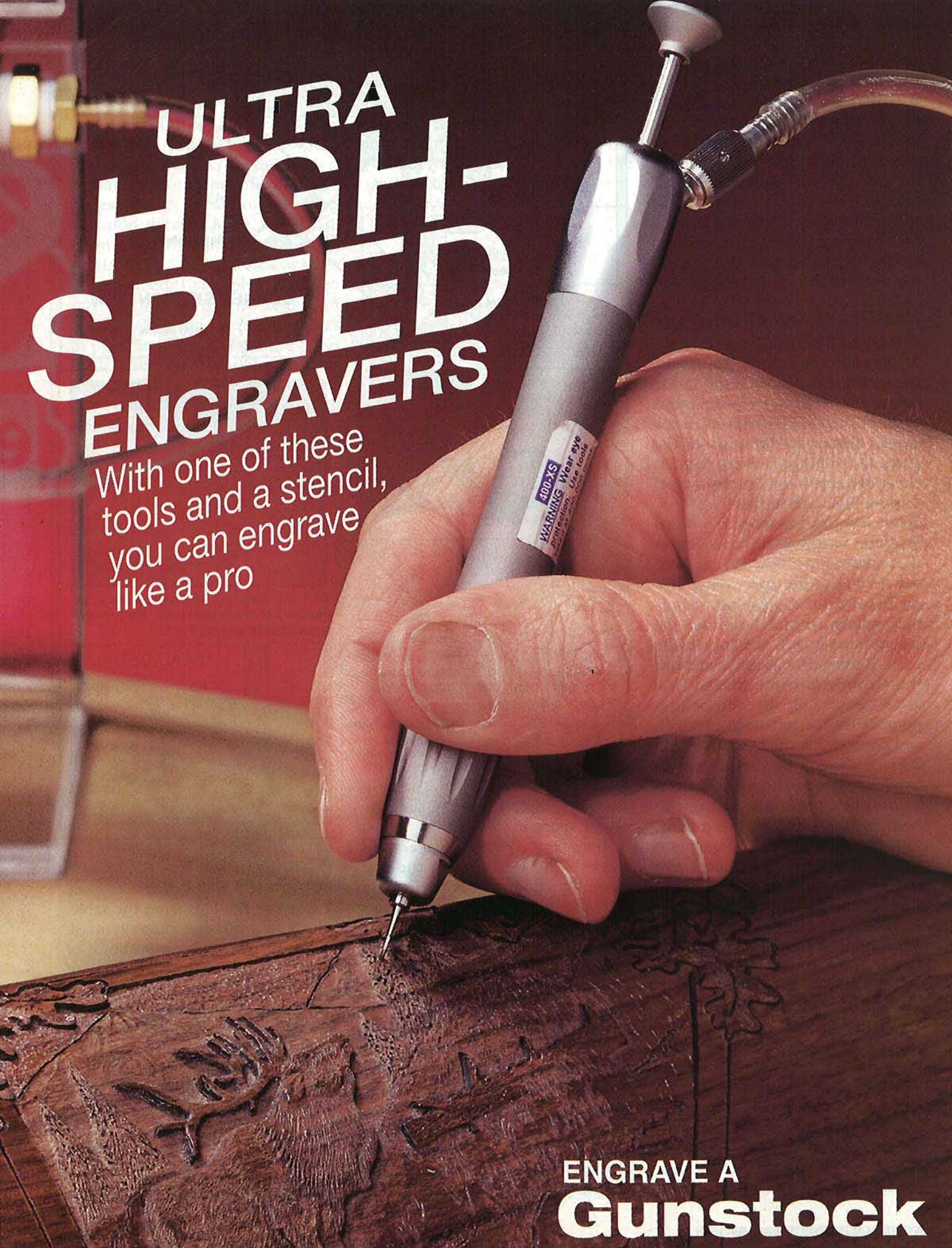


A tough finish completes the table

1 Remove the legs from the table, touch-up sand, and carefully mask the laminate. Apply your choice of finish. (We applied three coats of Minwax semigloss Fast-Drying Polyurethane, sanding with 320-grit sandpaper and using a tack cloth between coats.)

2 Reassemble the table, and remove the masking tape and paper from the laminate.

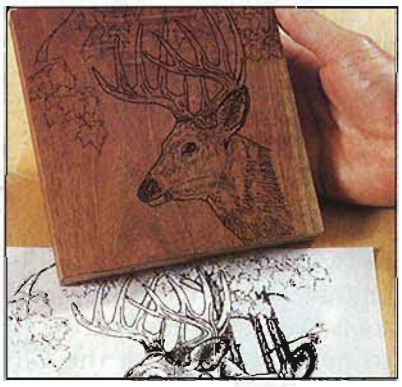
Written by Robert J. Settich
Project Design: Jan Hale Svec
Graphic Design: Perry McFarlin
Illustrations: Lorna Johnson
Photographs: Hopkins Associates


ULTRA
HIGH-
SPEED
ENGRAVERS
With one of these tools and a stencil, you can engrave like a pro
ENGRAVE A
Gunstock

If you can trace a line, you can enjoy great results engraving wood, metal, bone, glass, or countless other materials. Have doubts? We did, so we tested four kits ranging in price from $170 to $1,100 and found that after a little practice we could produce work like that shown throughout this article.

Fast Facts

•Even though these tools spin at incredible speeds—5,000 revolutions per second (300,000 rpm) under no load—they produce little torque. So, you can guide them along a surface with the same control you enjoy with a pen.



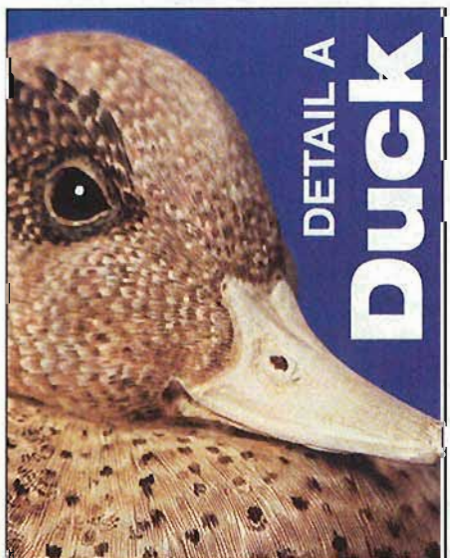
With no prior experience and little artistic ability, one of our staffers was able to engrave this scene using the stencil shown. With a little practice you can make deep engravings with super fine detail like the scene on the gunstock at left.

•These tools do not compare in any way with electric or battery-powered rotary tools such as those made by Dremel, Ryobi, and Black & Decker, that operate at 30,000 rpm and under. Those tools are great for hogging away material, but don't give you control over fine material removal. Ultra high-speed engravers do not vibrate in your hand the way that electric rotary tools do.

Testing engravers requires an eye for detail

When we first looked at these four engravers—Foredom 350K, Paragrave from Paragraphics, 400XS from SCM, and the Ultra-Speed Products Turbo Carver—we were struck by the wide range in pricing. The handpieces alone range from $95 to $550. So, we disassembled them as much as possible to check out the quality of key components such as the turbine, collet, and bearings.

To get a good feel for how well they work, we had a variety of woodworkers from seasoned woodcarvers to relative newcomers try them out on oak, walnut, and ebony. We also engraved tagua nuts and bone, and even etched some glass.



Dr. Lew Jensen

Engravers have their roots in the dental industry

Dr. Lew Jensen was a practicing dentist in 1975 when he came up with the idea of decorating an Easter egg with his dental drill. "I was amazed with the results, and pretty soon I was selling engraved eggs as fast as I could make them," Jensen recounted.

In 1979 he built the first straight (in-line) dental drill specifically for nondental work. (Dental drills have right-angle heads with the bit 90° to the handle—great for working inside of a mouth, but awkward for other applications.)

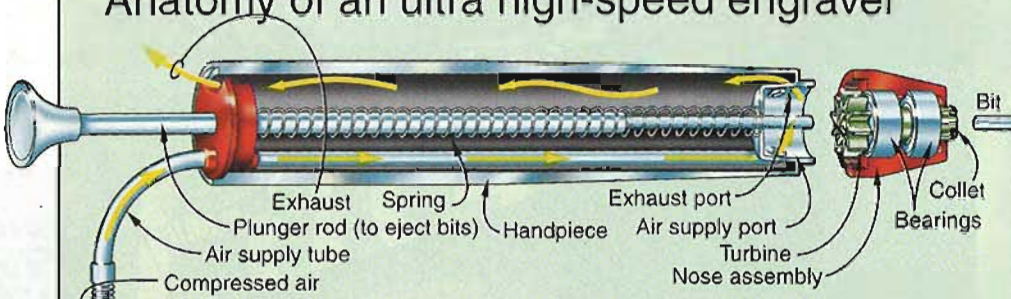
Jensen saw a demand for his modified drill, so he started selling Paragraphics-brand engravers in 1983. An incident in 1986 convinced him to make a complete career change. "I was in a grocery store and a young patient sitting in her mother's cart screamed in terror when she saw me. That day, I decided to get out of dentistry and into Paragraphics full-time."

Jensen owned the market until 1988 when SCM came out with a unit. Foredom and Ultra-Speed Products came into the market with lower-priced engravers in 1997.

Continued

HIGH-SPEED ENGRAVERS

Anatomy of an ultra high-speed engraver



As shown *above*, there's nothing complicated about how these tools work. A small turbine—the heart of these machines—attaches to a friction-fit collet near the nose of the handpiece. Two high-speed bearings hold the collet-turbine assembly in place.

An air supply tube in the handpiece directs a stream of compressed air across the turbine, causing it to spin rapidly. The Foredom, Paragraphics, and SCM 400XS have air supply tubes inside their handles as shown. The Ultra-Speed Products model has an external tube (see photo on the *last page* of this article). Depending on the model, exhaust air exits at the nose end (SCM) or passes back through the handpiece and out the top or side (others). You eject bits by pressing on a spring-loaded plunger rod atop the handpiece.

Let's take a closer look at those tiny bits

As shown in the photo *right*, a standard ⅛"-diameter shank carbide ball-cutter bit used in a motorized rotary tool dwarfs a 1/16" bit used in an engraver.

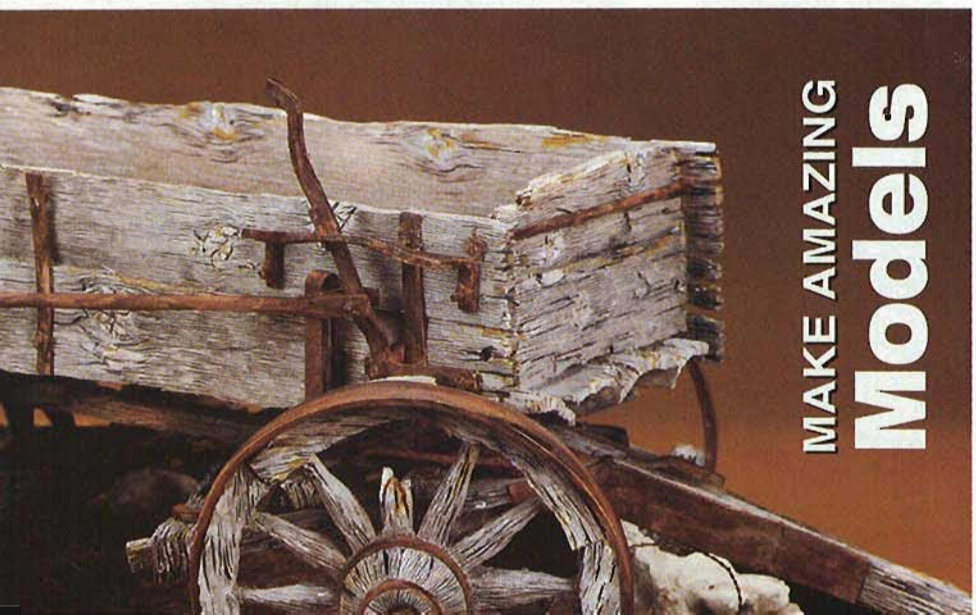
These tiny fluted carbide bits work well on a variety materials, including wood, metal, and glass. In our testing, we got several hours of wood carving out of one bit with careful usage. These all-purpose bits cost $1.50 to $5 each for most common profiles. Diamond bits designed for

Compressor requirements

Ultra high-speed engravers require a steady stream—.8 to 1.5 cubic feet per minute (cfm)—of compressed air at between 30 and 55 pounds per square inch (psi). So, any workshop air compressor will power one. For even greater portability, engraver manufacturers sell light, compact, tankless compressors. These oilless, diaphragm-type compressors run continuously unless they're equipped with an electric foot switch. (Good-quality tankless compressors sell for about $200; quiet-running models go for $400 to $800.)

Each engraver has a recommended air pressure setting to achieve the proper operating speed. Higher air pressure will deliver greater speed, but will shorten the life of bearings and carving bits.

A regulator installed between the handpiece and the compressor controls air pressure. To prevent water and dirt from contaminating the air supply, most regulator assemblies have a moisture trap and filter.



Micro die-grinders offer you an in-between option

As we rounded up tools for this article, we came across two micro die-grinders that fall between ultra high-speed engravers and motorized rotary tools. The PSI Turbo-Carver (not to be confused with the Ultra-Speed Products Turbo Carver mentioned earlier) operates at 56,000 rpm. It sells for $99 from Penn State Industries (800/377-7297). The RIA RA-600 ($135—from Woodcraft—800/535-4482) turns at 60,000 rpm. Both use ⅛"-diameter shank bits, although the PSI also comes with an adapter collet for 3/32" bits.

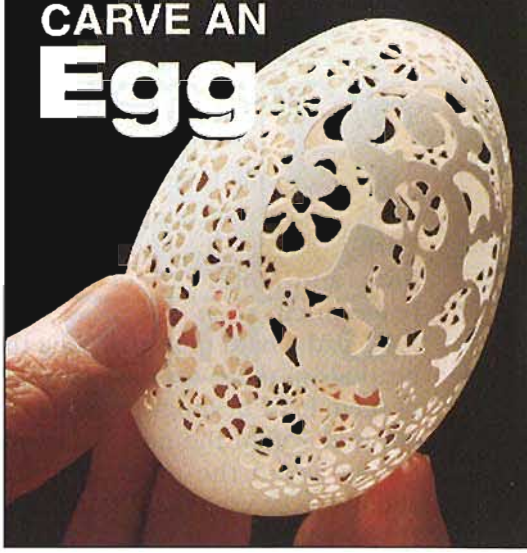
We found that they remove more material than engravers, but lack the small tools' control when it comes to detail work.

The PSI Turbo-Carver (right) and the RIA RA-600 micro air die-grinders spin between 56,000 and 60,000 rpm—much slower than engravers.

The 1/8"-diameter shank carbide bit typically used with motorized rotary tools (shown above and in the micro die-grinders below) dwarfs the 1/16"-diameter shank carbide bit used with engravers.

shaping wood and glass come in most of the same profiles as the carbide bits. More susceptible to heat damage, these bits cost $3 to $4 each. They're best suited for finish work because they cut less aggressively, and more smoothly, than carbide bits.

Stone-tipped bits for polishing wood, glass, and metal cost $1 to $3 each. Each engraver manufacturer carries a line of bits.



What to know before choosing an engraver

Here's what our investigation revealed about the key performance areas of these tools.

•Handling and control. In order to follow the fine lines in a pattern, the handpiece must be well balanced and properly weighted. In fact, our testers describe the proper engraving touch as similar to writing with a felt-tipped pen.

In general, most of our testers felt the contoured pen shape of the SCM 400XS makes it the most comfortable to hold. However, several mentioned that the light weight of the Turbo Carver made it the easiest to control. Although Lew Jensen of Paragraphics concedes that the SCM 400XS feels comfortable initially, he says that the shape of his unit causes less long-term hand fatigue. "And," he adds, "it can be easily mounted in a jig."

•On/off switches. The engravers turn on and off by one of two means when used with a tank-type compressor. If you buy a "basic" kit (see the description in the chart at the end of this article), you turn the handpiece on and off via a valve located in the air hose between the regulator and the handpiece. Both the Paragraphics and SCM products come with a hand-operated valve.

The Foredom comes with a foot pedal that fits between the handpiece and regulator via tubing to control air flow. We found this pedal particularly handy when used with a tank-type compressor. The Turbo Carver has a simple spring-loaded foot pedal that pinches the air supply tubing closed. While effective, this lightweight pedal shifted around underfoot.

You can also power the engravers with a tankless compressor. With these, you purchase a switch that turns power on and off to the compressor. Although these compressors work well, we found their constant noise bothersome.

•Quality of construction. We were impressed with the quality of the machining on the SCM 400XS handpiece. While not as sophisticated in design, the Paragrave handpiece also displayed top-quality machining and materials.

For example, the turbine fins in both of these commercial-grade tools have concave surfaces to catch more air, and turn more efficiently. Both also have internal baffles to muffle the exhaust air and replaceable collet sleeves.

Continued

HIGH-SPEED ENGRAVERS

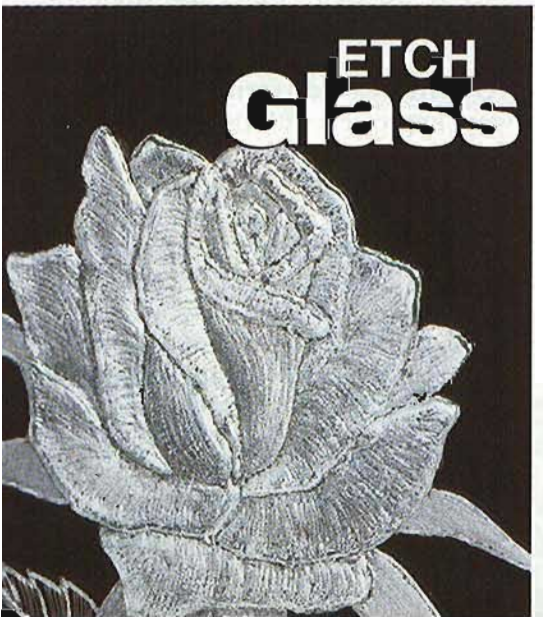
While sturdily built, the Foredom 350K lacks these refinements. The Turbo Carver's plastic body, turbine, and collet reflect its bare-bones price.

We had a hard time analyzing the bearings in these tools, since three of them have bearings permanently encased within the nose assembly. So we asked the manufacturers about the bearings and found two schools of thought.

Dr. Lew Jensen at Paragraphics told us his firm uses an open design bearing for a couple of reasons. An in-line oiler mounted next to the regulator gives these bearings a continuous bath of fresh lubricant that keeps fine debris flushed out. Jensen said that because of this, the bearings run cleaner and cooler, and therefore last longer. "If you use our engraver every day for four hours, you won't have to replace the bearings for a year," Jensen told us. "Then, send the unit to us and we will press new bearings into place for $80."

Ultra-Speed Products and Foredom also uses an open bearing. These tools do not come with an inline oiler, so you have to stop every few minutes and add a drop of oil.

SCM uses sealed bearings that don't require oil as frequently. Scott Moore of SCM said the bearings in the SCM 400XS have an oil-impregnated phenolic shield that continuously lubricates the bearings while keeping out debris. Periodic oiling (every four hours of use) cleans the turbine of debris. "We figure you can use our tool for 4-5 hours every day for about two years before you need to have the turbine rebuilt ($100), or just buy a new turbine ($149)," Moore told us. "We sold the continuous-oil system for a number of years, but our biggest complaint was leaking oil, and we don't have that problem any longer," Moore added.



The regulators for the Foredom 350K (left), SCM 400XS (middle), and Paragrave come with filters and moisture traps installed, a requirement for prolonging bearing life.

In our limited usage, we followed the recommended oiling procedures religiously, and had no problems with any of the tools. The Paragrave did not spill oil onto the handpiece or workpiece as long as we had the continuous oiler adjusted properly. The chart *opposite page* shows how often you need to apply oil, and what a replacement turbine assembly cartridge costs.

• **Ease of adjusting regulator.** The Foredom 350K, Paragrave, and SCM 400XS use identical Norgren regulators as shown in the photo at *top*. While the gauges vary slightly, the regulators adjust quite easily to the recommended pressure and stay put. These units also contain filters and moisture traps.

Ultra-Speed Products offers an inexpensive ($15) optional in-line regulator that has no gauge. You adjust the air pressure by listening to the pitch of the Turbo Carver, and setting the regulator when the tool just begins to slow down from maximum speed. While not as convenient as reading a gauge, it does work effectively.

• **Clarity of instructions.** All of the engravers come with printed operating instructions, and all but the Foredom include an introductory videotape. Even though printed on individual sheets of paper, the manual with the Turbo Carver was the most detailed, yet still easy to follow. The videotapes help you quickly grasp the cutting technique, especially how to know by sound when you've achieved the correct cutting stroke.

• **Other considerations.** All of our testers noted that the Foredom seemed to have slightly less power than the other units. Other than that, we didn't find significant differences in how well they engraved various materials.

We found the noise level tolerable on all tools, but as indicated in the chart, some were less irritating than others. We liked the exhaust jets located in the tip of the nose on the SCM 400XS. The three jets blow away dust, making it easier to follow pattern lines.

Choosing an engraver: there's one for every budget

Our test units fall into two distinct classes based on price. The Turbo Carver and the Foredom 350K offer home hobbyists a relatively inexpensive entry into detail carving and engraving. In our tests, the Turbo Carver performed the same work as the more expensive units. And it held up fine, although we used it for just several weeks. You can replace the entire handpiece for about the same as, or less than, the cost of rebuilding the others. For about $200 more, Foredom's basic kit offers a metal handpiece, a much nicer foot pedal, and a full-blown regulator.

If you want to get seriously into engraving, perhaps as a business opportunity, you won't regret spending the big bucks on the commercial-grade SCM 400XS or Paragraphics Paragrave. Currently, these products have available a much larger array of accessories, patterns, and training materials than the other units.

If you're trying to choose between the SCM and Paragraphics engravers, use the information presented in this article, but also take the time to talk with people from both companies. Make your decision based on which company you feel more comfortable with, and which product better suits your needs.

Engravers shown full-size

TAKE A CLOSE-UP LOOK AT FOUR ULTRA HIGH-SPEED ENGRAVERS

MANUFACTURER/ IMPORTER	MODEL	SIZE (1) DIAMETER x LENGTH (INCHES)	BEARING TYPE (2)	BODY MATERIAL (3)	HANDPIECE: BIT SHANK DIAMETER (INCHES)	HANDPIECE: RECOMMENDED AIR PRESSURE (POUNDS PER SQUARE INCH)	HANDPIECE: RECOMMENDED OILING INTERVAL	HANDPIECE: COST OF REPLACEMENT TURBINE ASSEMBLY	HANDPIECE: AIR FILTER (YES, NO)	REGULATOR: MOISTURE TRAP (YES, NO)	REGULATOR: PRESSURE GAUGE (YES, NO)	PERFORMANCE (4): HANDLING	PERFORMANCE (4): COMFORT	PERFORMANCE (4): EASE OF OPERATION	PERFORMANCE (4): MAINTENANCE	PERFORMANCE (4): NOISE (5)	COUNTRY OF ASSEMBLY (6)	WARRANTY	PRICE - HANDPIECE ONLY	"BASIC" KIT PRICE (7)	COMMENTS
FOREDOM	350K	.67 X 5	O	SS	0.062	35-40	8 hours	$ 95	Y	Y	Y	G	G	E	E	G	U	1 year	$225	$ 349 (a)	A high-quality tool with an excellent warranty.
PARAGRAPHICS	Paragrave	.56 X 4.20	O	SS	0.062	30	Continuous	169	Y	Y	Y	E	G	E	E	G	U	6 months	435	1,100 (b)	Excellent workmanship backed by a solid reputation.
SCM	400XS	.59 X 4.53	S	AL	0.062	34	4 hours	149	Y	Y	Y	E	E	E	E	E	J	6 months	550	995 (c)	Favorite tool among testers, loaded with commercial-quality features.
ULTRA-SPEED PRODUCTS	Turbo Carver	.44 X 3.33	O	PL	0.062	35-55	15 minutes	N/A	N	N	N	G	G	G	G	G	U	3 months	95	170 (d)	Bargain-priced tool for beginners or intermediates.

NOTES:

1. Body diameter measured at handgrip location.
2. (S) Sealed
   (O) Open
3. (SS) Stainless steel
   (AL) Aluminum
   (PL) Plastic
4. E Excellent
   G Good
5. E Lower pitched, muffled
   G Higher pitched, but tolerable
6. (U) United States
   (J) Japan
7. Kit includes:

(a) Handpiece, foot pedal, regulator/filter, tube, 12' hose, 3 carbide bits, nose assembly wrench, manual

(b) Handpiece, regulator/filter, in-line oiler, oil, 15 bits w/case, compressor hose, tubing, handpiece stand, goggles, mask, manual, instructional video (5 hours), carrying case

(c) Handpiece, regulator/filter, oil, 25 bits w/case, compressor hose, tubing, handpiece stand, goggles, mask, manual, instructional video, wildlife artwork, 25 stencil sheets, carrying case

(d) Handpiece with tubing, foot-control pedal with hose, tube, 3 bits, manual, instructional video

WHERE TO CALL FOR INFORMATION:

Foredom
203/792-8622

Paragraphics
800/343-1717

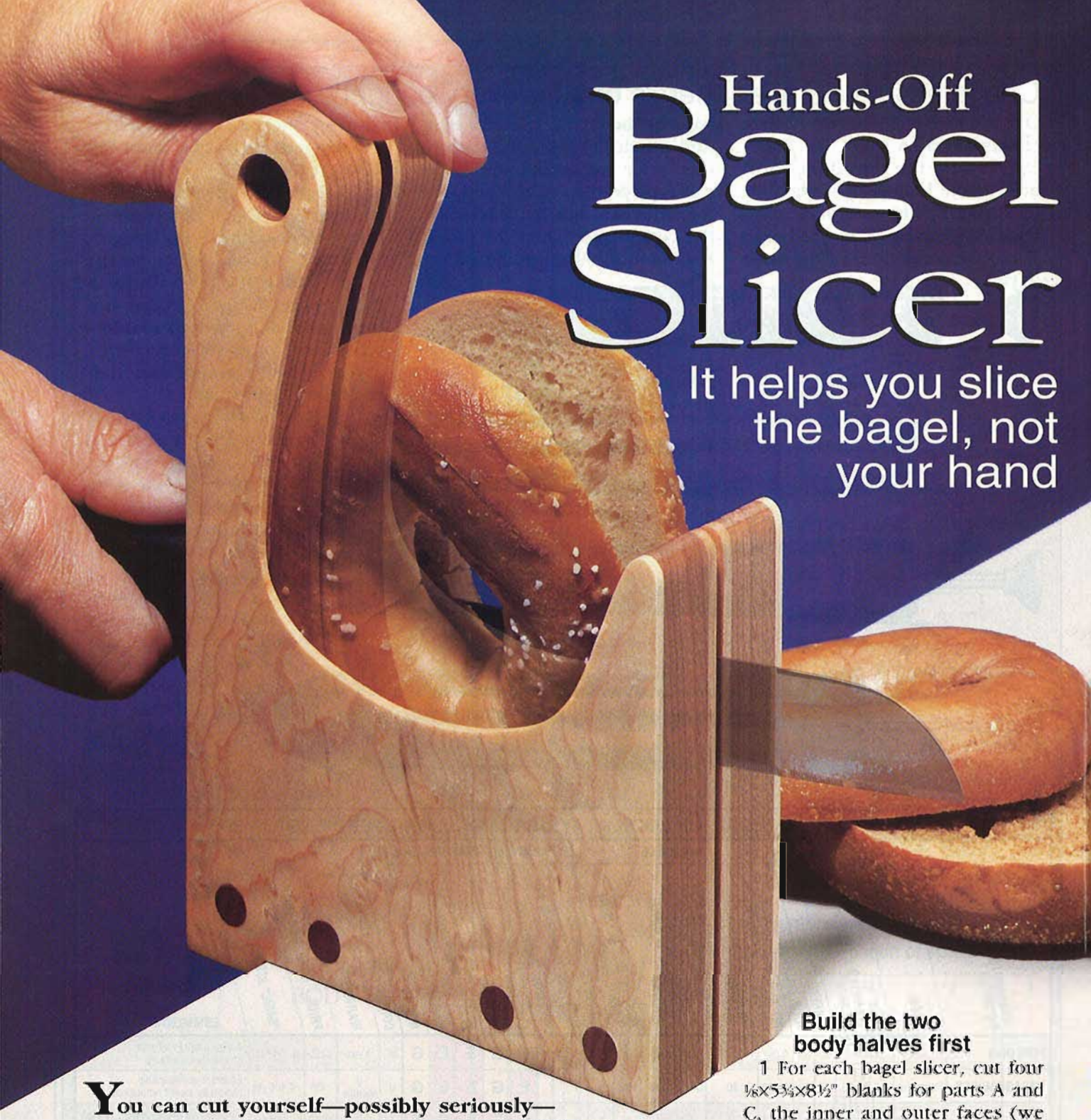
SCM
800/755-0261

Ultra-Speed Products
503/622-4387

Technical consultant: Jim Rose Illustrations: Kim Downing Photographs: Marty Baldwin

Hands-Off Bagel Slicer

It helps you slice the bagel, not your hand



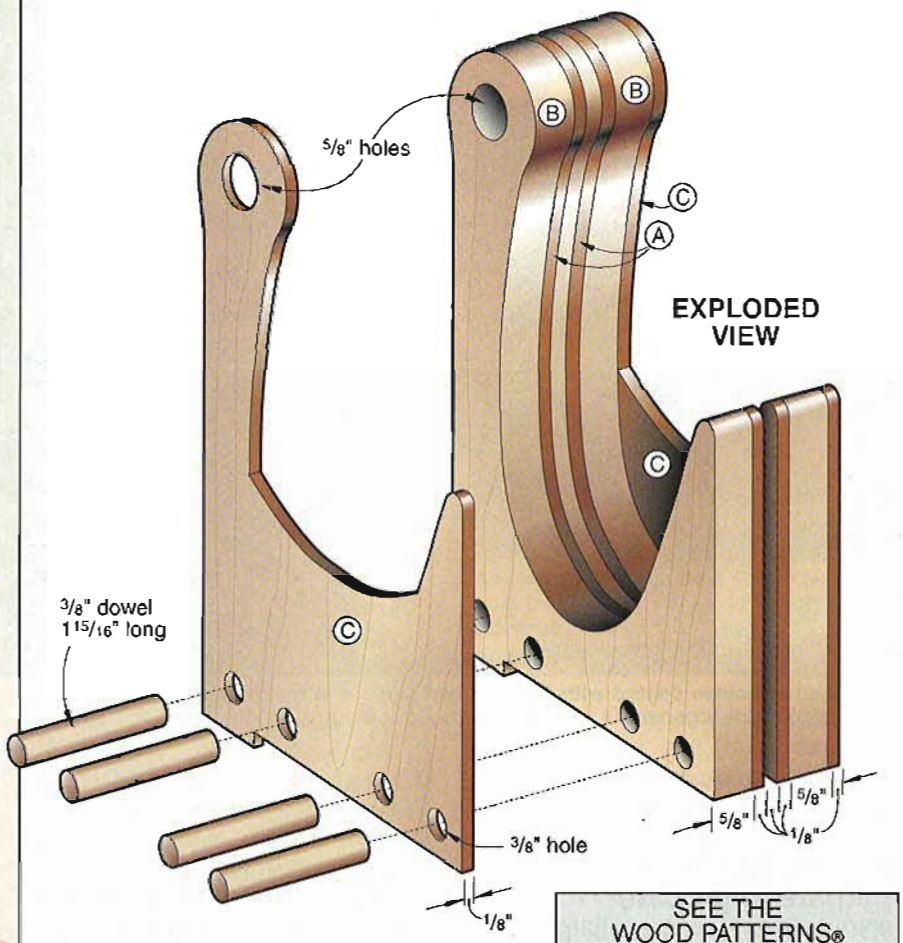
You can cut yourself—possibly seriously—hanging onto a bagel bare-handed while slicing it. To avoid trouble, stick the bagel into our handy holder. Its tall handle puts your hand safely above the knife blade.

Note: We sized our holder for the 4"-or-so bagels commonly available in our area. If you usually buy fatter, larger bagels, enlarge the pattern to fit them.

Build the two body halves first

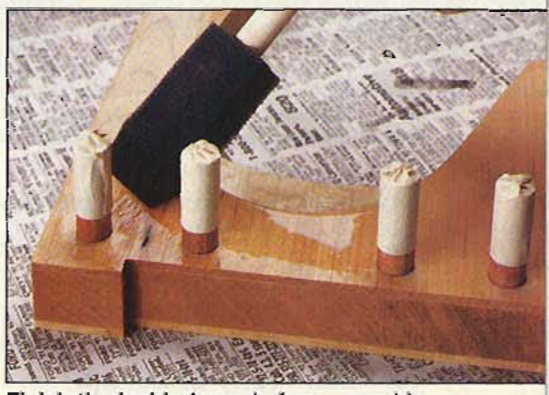
1 For each bagel slicer, cut four ⅛×5¾×8½" blanks for parts A and C, the inner and outer faces (we used maple), and two ⅜×5¾×8½" blanks for parts B, the body cores (we used cherry). Cut two pieces of ¾"-thick scrapwood the same size for clamping pads. You'll also need four 1 5⁄16" lengths of ⅜" cherry dowel rod.

2 Make two photocopies of the Full-Sized Pattern, which you'll find in the *WOOD PATTERNS*® insert in the middle of the magazine.



SEE THE WOOD PATTERNS® INSERT FOR FULL-SIZED PATTERN

Drill through both body halves at once. This way, the sides will mate accurately.



Finish the inside faces before assembly. Mask the dowels for good glue joints.

3 Glue up two laminations, each consisting of one thin blank (A) and one thick blank (B). Square the edges, and clamp the laminations between the scrapwood pads until the glue dries.

4 Unclamp the laminations, and fasten them together with double-faced tape, placing the ⅛"-thick faces together. Adhere a copy of the pattern to the stack, using rubber cement or spray adhesive.

5 Bandsaw slightly outside the pattern line. Follow the dotted line inside the throat. Using a drum sander, sand the throat area to the dotted line. You can sand slightly beyond the ends of the dotted line, but don't sand the rest of the edge yet. Remove the pattern, but do not separate the parts.

6 Tape the remaining ⅛"-thick blanks together, and adhere the remaining pattern to the stack. Bandsaw or scrollsaw around the solid pattern line, leaving the line.

7 Separate the pieces, and glue them to the outside faces of the taped-together parts. Clamp them between scrapwood pads until the glue dries, then sand to the line.

Now, put the halves together

1 Chuck a ⅜" bit (or the size that best matches your ⅜" cherry dowels) in your drill press, and drill the four holes along the bottom, shown *top right*. Change to a ⅝" Forstner bit, and bore the hole at the top of the handle.

2 Remove the pattern. Separate the parts, and sand the inside face of each one smooth.

3 Glue the four dowels into the ⅜" holes in one laminated body half. Bring the ends flush with the body's outer face.

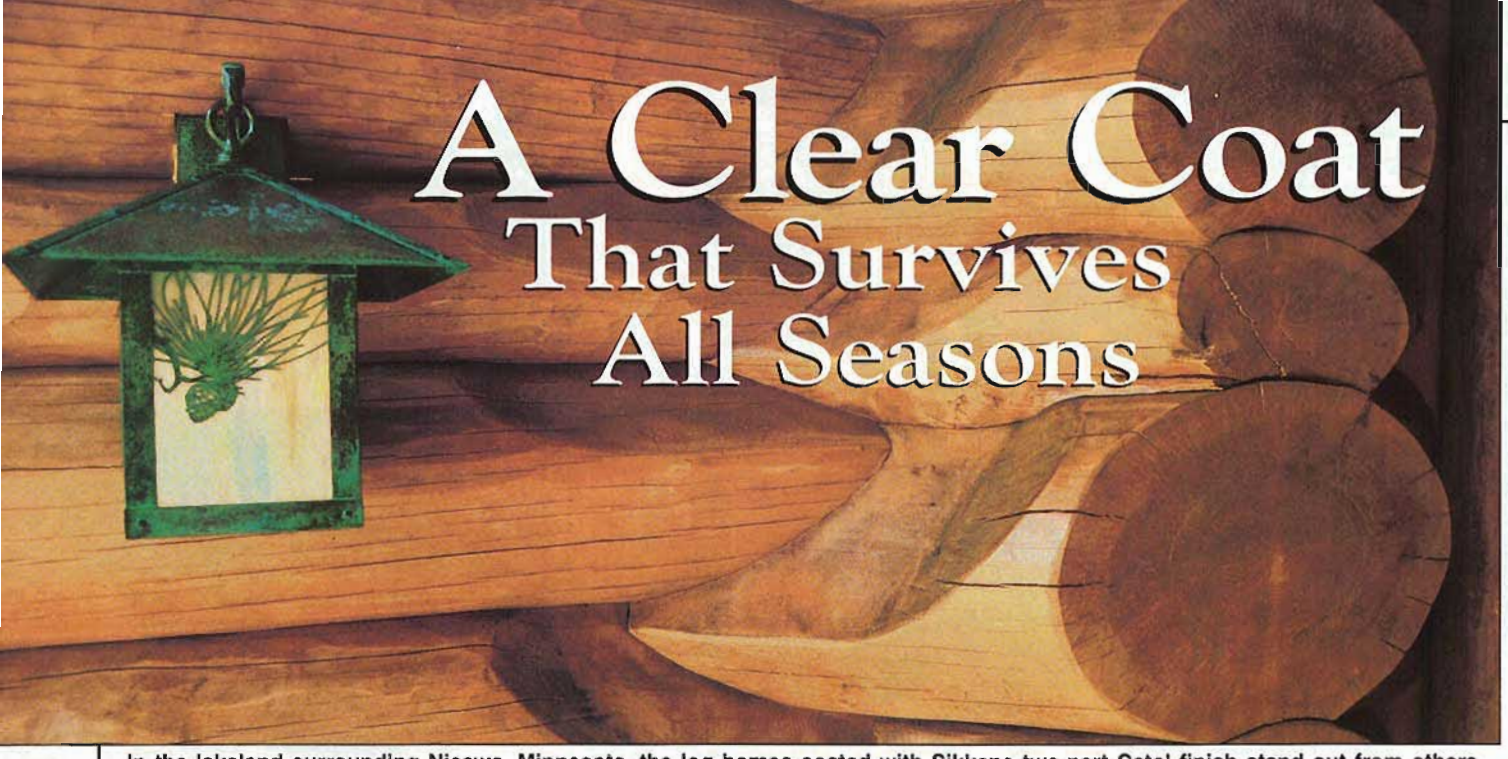
4 It's easier to apply the finish to the inside faces and edges before final assembly. Mask about ¾" at the end of each dowel, then apply a clear oil finish as shown *above*. On the other half, be careful not to get finish in the dowel holes. (You could stick wads of paper or cotton balls in the holes to protect them.) After the oil cures, spray on clear polyurethane for durability.

5 Allow the finish to dry, then remove the masking. Apply glue to the dowel ends, and slide the other body half onto them. Slip scraps of ⅛"-thick material between the halves to space them evenly.

6 Sand the dowel ends flush on both sides. Finish-sand the outside faces, and apply the oil and polyurethane as before.

Project Design: Larry Johnston
Photographs: Wm. Hopkins; Marty Baldwin
Graphic Design: Perry McFarlin
Illustrations: Roxanne LeMoine; Lorna Johnson

A Clear Coat That Survives All Seasons



In the lakeland surrounding Nisswa, Minnesota, the log homes coated with Sikkens two-part Cetol finish stand out from others with their warm glow. The lightly pigmented formula contains a generous amount of ultraviolet ray protection.

Northern Minnesota's weather extremes usually mean a short life for clear exterior finishes. But home designer Gary Severson has discovered one that really holds up.

Sun and moisture, heat and cold combine to wear down outdoor finishes, particularly clear ones. That's especially true in Nisswa, Minnesota, where winter temperatures plummet to -55° and summer ones soar to 100°. Rain floods surfaces, too. Then, there's a winter snow blanket. Sand granules tracked from lake beaches take their toll as well, slicing through surface film like tiny knives.

Gary Severson, with his wife, Leslie, own and operate Structures International, Inc. He prides himself on providing the best products and materials available to his clientele for their permanent and summer dwellings. "The company is a coalition of craftsmen who work to create homes that serve as backdrops for the individuals that live in them," he continues. "In heading it up, I feel a real responsibility not to recommend anything until I've used it and can vouch for it. And Sikkens Cetol two-part finish is probably the finest natural exterior wood coating available."

For outdoor finishes, prepare to prepare

Whether it be a bench, planter, deck, or a log home, the key to a lasting exterior finish is the proper preparation of the surface, according to Scott Roesner, Gary's application expert at Structures International. "Mill glaze on smooth lumber causes the most problems. Basically, it's an invisible pitch that has been heated up in the wood's milling process. It surfaces and rehardens to block any stain or finish from penetrating or adhering.

"A lot of times, too, during handling or machining, the wood's pores—and this happens on logs—get crushed, in effect sealing them," Scott continues. "What you have to do in either case is clean the surface, then reopen the pores to get a good bonding surface. After sanding the wood with 120-grit paper, I like to use a product called Mill Glaze Away [see Buying Guide]. But a solution of four ounces trisodium phosphate [TSP], one quart of household bleach, and three quarts of water works, too. TSP acts as the deep wood cleaner, and the bleach softens the wood pores so the glaze can be washed off with water. Stripped wood must be similarly prepared."

A finish that relies on a brush

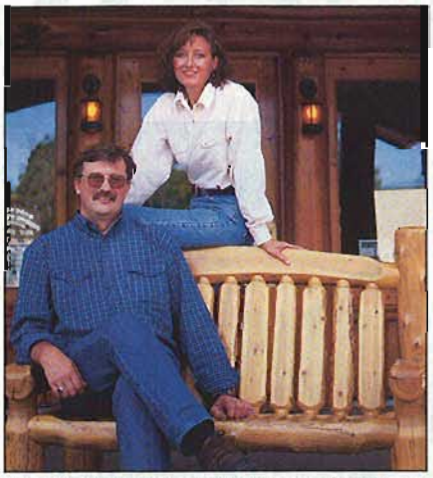
The Sikkens line of finishes was discovered in Holland about 25 years ago by fellow Minnesotan and friend of Gary's, Dennis Anderson. Back in 1976, Anderson, who marketed cedar log homes, began importing and selling it. After a few years, though, the manufacturer, Akzo Nobel, officially brought Sikkens to the U.S., and now sells it through dealers nationwide.

The Sikkens natural exterior finish Gary and Scott work with is actually a two-can coating that involves Cetol 1, a penetrating sealer, and Cetol 23 Plus, a thick, translucent, lightly pigmented, protective coating with ultraviolet blocking. "And its application varies," advises Scott. "Generally speaking, for rough-sawn siding and logs, we use

one coat of Cetol 1, followed by two coats of Cetol 23 Plus. For horizontal surfaces, like benches, where water can sit, we apply only Cetol 1 in three coats. Cetol 23 Plus produces a thick film that might lift if moisture gets under it. And every coat requires a 24-hour drying time, with no sanding in between. The best thing is to contact a sales outlet for application details."

The recommended application technique for the Sikkens Cetol finish is brushing, a method that recalls its European heritage. Says Gary, "Almost any finish made in America has to be formulated so that a 12-year-old can slap it on and still have it come out even. To do that, it has to be thinned down. In Europe, I couldn't even sell you a can of Sikkens unless you've been through their finishing school. Over there, finishing is an art like woodcraft." (Sikkens does sponsor a series of finishing schools across the U.S. to teach application to dealers and their representatives.)

Only brushing smooths the thick Cetol 23 Plus coating and allows it to cover checks, splits, and rough surfaces, such as on the logs in this home.



Architectural designer Gary Severson and Leslie, his wife and partner, use Sikkens Cetol 1 and Cetol 23 Plus on everything from logs to furniture.

"Because the product is translucent, yet pigmented, if you get too much on, it runs and drips, concentrating pigment in the accumulations. That's why you want to brush to a natural stopping point," adds Scott. "Lap marks show up as accentuated color, so you have to keep a wet edge." Gary, nodding in agreement, says, "And use a good, China-bristle brush. Cheap brushes drip a lot, don't hold product, and don't provide an even flow. But all the effort is worthwhile; it'll average three to five years between recoats, depending on exposure. And, you only have to recoat what looks worn. With the Cetol system, the finish takes the beating, not the wood."

Buying Guide

Sikkens dealers normally offer small sample cans of the two-part Cetol finish, so that you can try the different tints (it's available in 10) on scrapwood and avoid surprises. Cetol 1 costs about $15 a quart, $43 a gallon. The price of Cetol 23 Plus runs about $17 a quart, $49 a gallon. Five-gallon pails of each also available. Use paint thinner or mineral spirits as a solvent. For a dealer near you, call 800/833-7288. Mill Glaze Away is a concentrate you add to water. It costs $5 for 8.8 ounces (800/858-5011).

Although after application Cetol 23 has a clear appearance, it actually has a light pigmentation. As shown on these three sample boards, the tinted finishes still let the wood show through.

Written by Peter J. Stephano
Photographs: Layne Kennedy

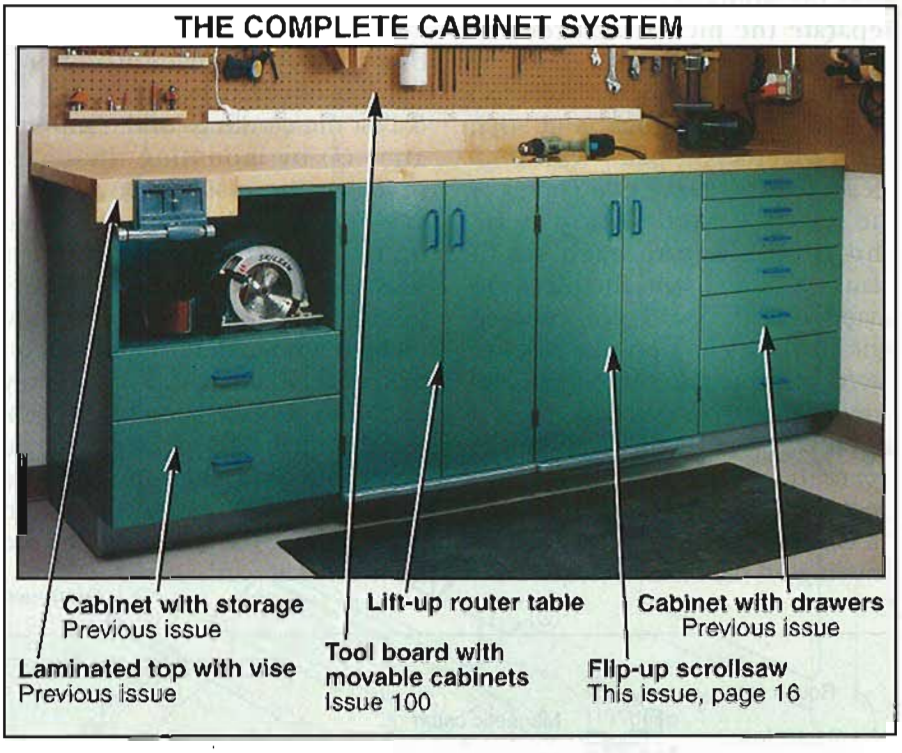
Lift-Up Router

You can also build this cabinet as a flip-up benchtop tool cabinet. See the related article on *page 16* for details on making this handy alternative.

Table

Smart Solutions For Your Basement Shop
IDEA SHOP 3
From The Editors Of *WOOD*® Magazine

In the previous issue, we showed you how to make the end cabinets and the sturdy laminated top for the IDEA SHOP 3 workbench. Now, with the basics out of the way, let's add a pair of cabinets–one with a lift-up router table (explained here), and another on *page 16* with a flip-over top that accommodates a benchtop power tool. To access a tool, simply open the cabinet doors, tap the foot pedal, pull up the table, and lock it in place. With the cabinet having the flip-over top, you'll also need to swivel it 180° and then lock it in place.



Let's begin with the basic carcase assembly

1 Rip and crosscut the carcase top and bottom (A), sides (B), back (C), and doors (D) to the sizes listed in the Bill of Materials from ¾" medium density fiberboard (MDF) or birch plywood.

2 Mark the locations, and cut or rout the rabbets on the inside face of the sides (B) where dimensioned on the Exploded View and Parts View drawings. The Parts View drawing is located on the *WOOD PATTERNS*® insert in the center of the magazine.

3 Drill the ½" chain-access holes through the bottom (A) where dimensioned on the Parts View.

4 Cut the spacers (I) to size from ½" solid stock. Glue and screw a spacer to the inside face of each side (B) where dimensioned on the Parts View drawing on the pattern insert. Next, drill a ⅜" hole through each spacer and through the mating side (B) where dimensioned on the Mounting the Pull-Up drawing. (To keep our ⅜" holes perpendicular to the sides, we did this on a drill press.) Countersink the holes on the outside surface of each carcase side.

5 Glue and clamp the basic cabinet pieces (A, B, C) together, checking for square. Drill the mounting holes, and strengthen the assembly with wood screws.

6 Drill a pair of holes through each door (D) for the pulls. Next, rout a ⅛" round-over on the front edges of each door.

7 Mount a pair of no-mortise overlay hinges on each door where shown on the Exploded View drawing. Screw the doors to the cabinet, leaving a 1/16" gap between the door bottoms and bottom surface of the bottom (A). See the Side Section View for reference.

Construct the base

1 Cut the base front and back (E), sides (F), and cleats (G) to size.

2 Cut the rabbets in parts E and F where shown on the Exploded View drawing. Glue and screw the base (E, F, G) together in the configuration shown. Later, fill the counterbored screw holes with wood filler and sand smooth.

3 Using the Parts View for reference, cut the foot pedal (H) to shape. Form a pair of ½" slots for the chains in the pedal where shown on the drawing. Drill the holes for the 2½" screws. Rout ⅛" round-overs on the top front and ends. Then, rout a ⅜" round-over along the top back edge.

Add the pull-up assembly

1 Cut the two support arms (J) to size (20¾×21½"). With the edges and ends flush, stick the two pieces together face-to-face. Mark

Continued

Lift-Up Router Table

the centerpoints where shown on the Parts View on the pattern insert. Drill the ½" hole. Lay out the 19" radius and notch. Cut and sand the support arms to shape. Separate the pieces, and remove the tape.

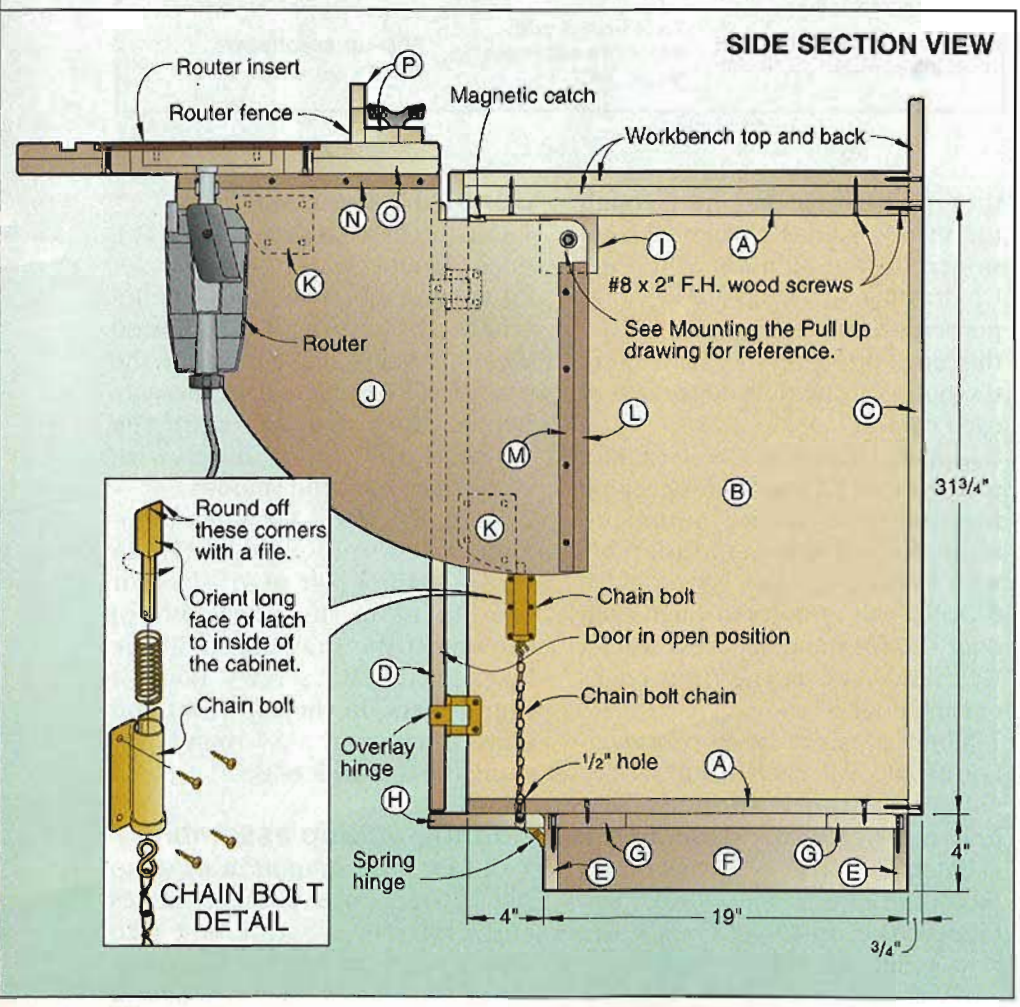
2 Cut four latch-block blanks (K) to 3×4" from ¾" stock, and stick them together in pairs with double-faced tape. Make two copies of the full-sized latch-block pattern, and adhere one to each set of blanks. Cut and sand the pieces to shape, drill the 5/32" holes, countersink the holes on opposite sides of each pair, separate the pieces, and remove the paper patterns.

3 Screw (no glue) the latch blocks (K) to the outside face of each support arm (J) where dimensioned on the Router Table Support Arms drawing on the Parts View.

4 Using the Mounting the Pull-Up drawing for reference, drive a ⅜" bushing (½" O.D.) into the ½" hole in each support arm (J). Drive the bushings flush with one surface, and trim them flush with the other. (See the Buying Guide for our source of hardware.)

5 Test the workings of the support arms (J) by mounting the chain bolts on the inside face of each cabinet side where dimensioned on the Side drawing on the Parts View on the *WOOD PATTERNS®* insert. Remove the bolts from the metal housing, and round the corners of the bolts with a file so they don't dig into the latch blocks (K). See the Chain-Bolt detail accompanying the Side Section View for reference. Reassemble the chain bolts so that the long edge of the bolts faces inward.

Continued



Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
CARCASE AND BASE					
A top & bottom	¾"	23"	23½"	MF	2
B sides	¾"	23¾"	31¾"	MF	2
C back	¾"	23½"	31¾"	MF	1
D doors	¾"	11¾"	31½"	MF	2
E front & back	¾"	4"	23½"	MF	2
F sides	¾"	4"	19"	MF	2
G cleats	¾"	4"	23½"	MF	2
H foot pedal	¾"	6"	23½"	MF	1
I spacers	½"	3"	3"	H	2
PULL-UP					
J support arms	¾"	20¾"	21½"	MF	2
K latch blocks	¾"	3"	4"	H	4
L panel	¾"	16"	19"	MF	1
M panel cleats	¾"	¾"	16"	H	2
N router top cleats	¾"	¾"	13⅝"	H	2
TOP AND FENCE					
O* router top	1½"	22"	22"	LMF	1
P fence & base	¾"	3"	22"	MF	2

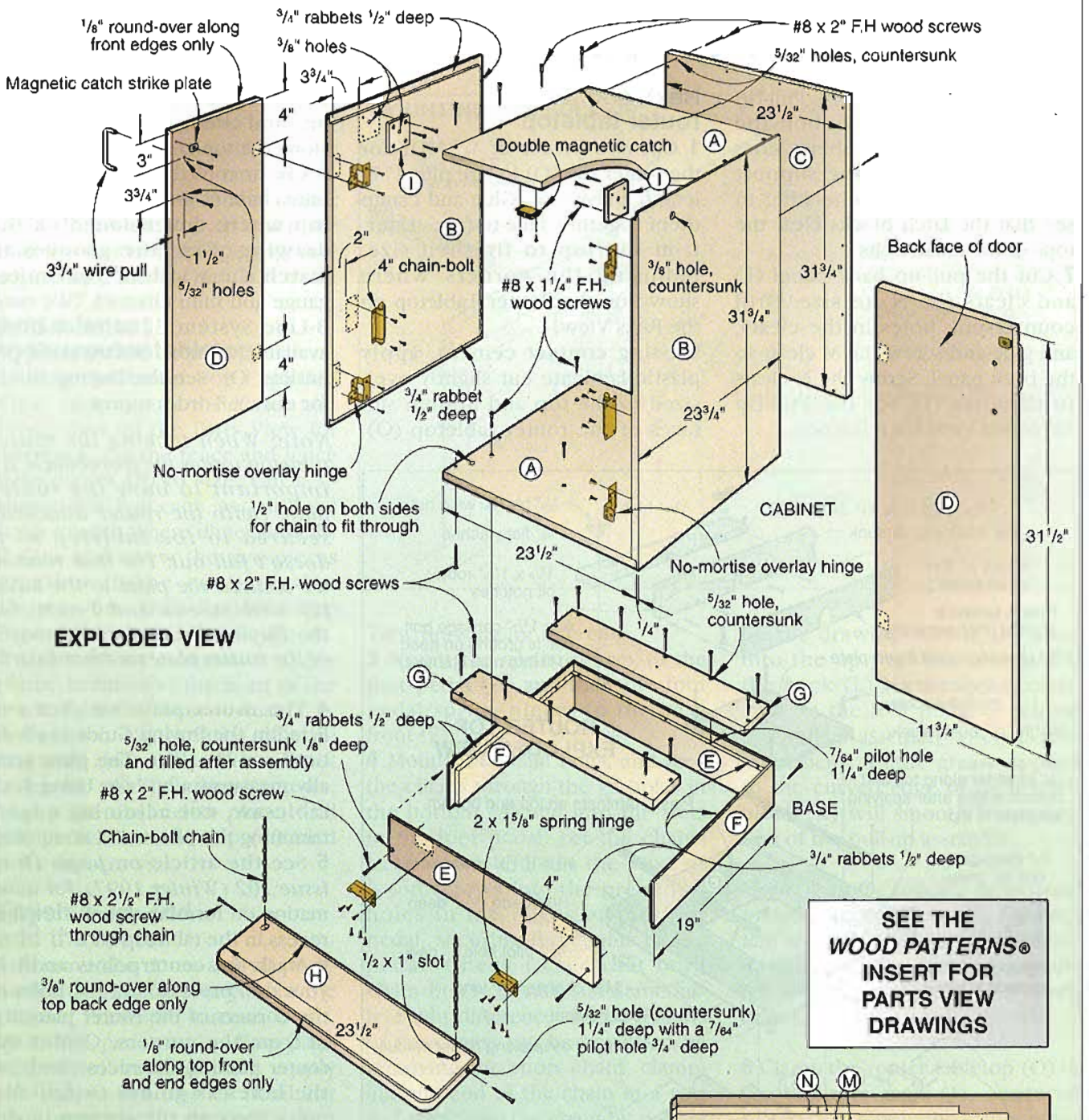
*Cut parts marked with an * oversized. Trim to finished size according to the how-to instructions.

Materials Key: MF–medium density fiberboard, H–hardwood, LMF–laminated medium density fiberboard.

Supplies: #6×1", #8×1¼", #8×1½", #8×2", and #8×2½" flathead wood screws; two pair of 270° no-mortise hinges; 2–3¾" pulls; double magnetic catch and strike plates; 2–⅜×3½" flathead machine screws with nuts and flat washers; ⅜" locknuts; 2–⅜"ID×½"OD×1" bronze or nylon bushings; 2–4" chain bolts (Stanley #1055-4"); one pair of 2×1⅝" spring hinges (Brainerd #161XC), plastic laminate, contact cement; ¼–20×1½" flathead machine screws; 4–¼" prongless T-nuts; B72 mini channel, 2–plastic wing nuts with ⅜" flat washers; 2–⅜×1½" carriage bolts; primer; paint; polyurethane.

Buying Guide

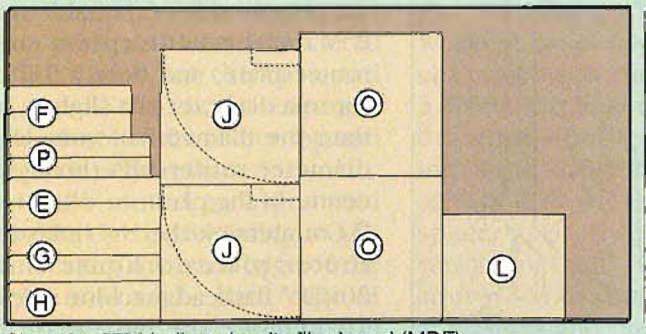
Partial hardware kit. ⅜×12×12" phenolic router plate, 2–19"-long pieces of mini channel, two pair of 270° no-mortise hinges; 2–⅜"ID×½"OD×1" bronze or nylon bushings; 2–4" chain bolts; one pair of 2×1⅝" spring hinges, 4–¼" prongless T-nuts; 2–plastic wing nuts with ⅜" flat washers. Kit no. FU-RT, $79.95 ppd. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247. To order call 800/346-9663 or e-mail them at schsons@kctc.net



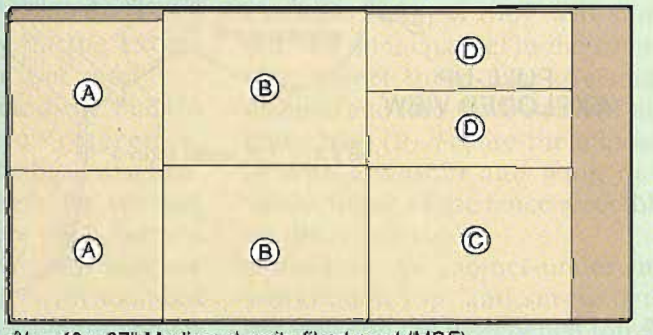
SEE THE *WOOD PATTERNS*® INSERT FOR PARTS VIEW DRAWINGS

*Plane or resaw to thickness listed in the Bill of Materials.

CUTTING DIAGRAM



3/4 x 49 x 97" Medium density fiberboard (MDF)



3/4 x 49 x 97" Medium density fiberboard (MDF)

Lift-Up Router Table

6 Using the Mounting The Pull-Up drawing for reference, bolt the support arms to the cabinet sides and spacers. Swing the support arms up and down, checking to see that the latch blocks clear the tops of the chain bolts.

7 Cut the pull-up back panel (L) and cleats (M, N) to size. Drill countersunk holes in the cleats, and glue and screw the M cleats to the back panel. Screw the N cleats to the arms (J). See the Pull-Up Exploded View for reference.

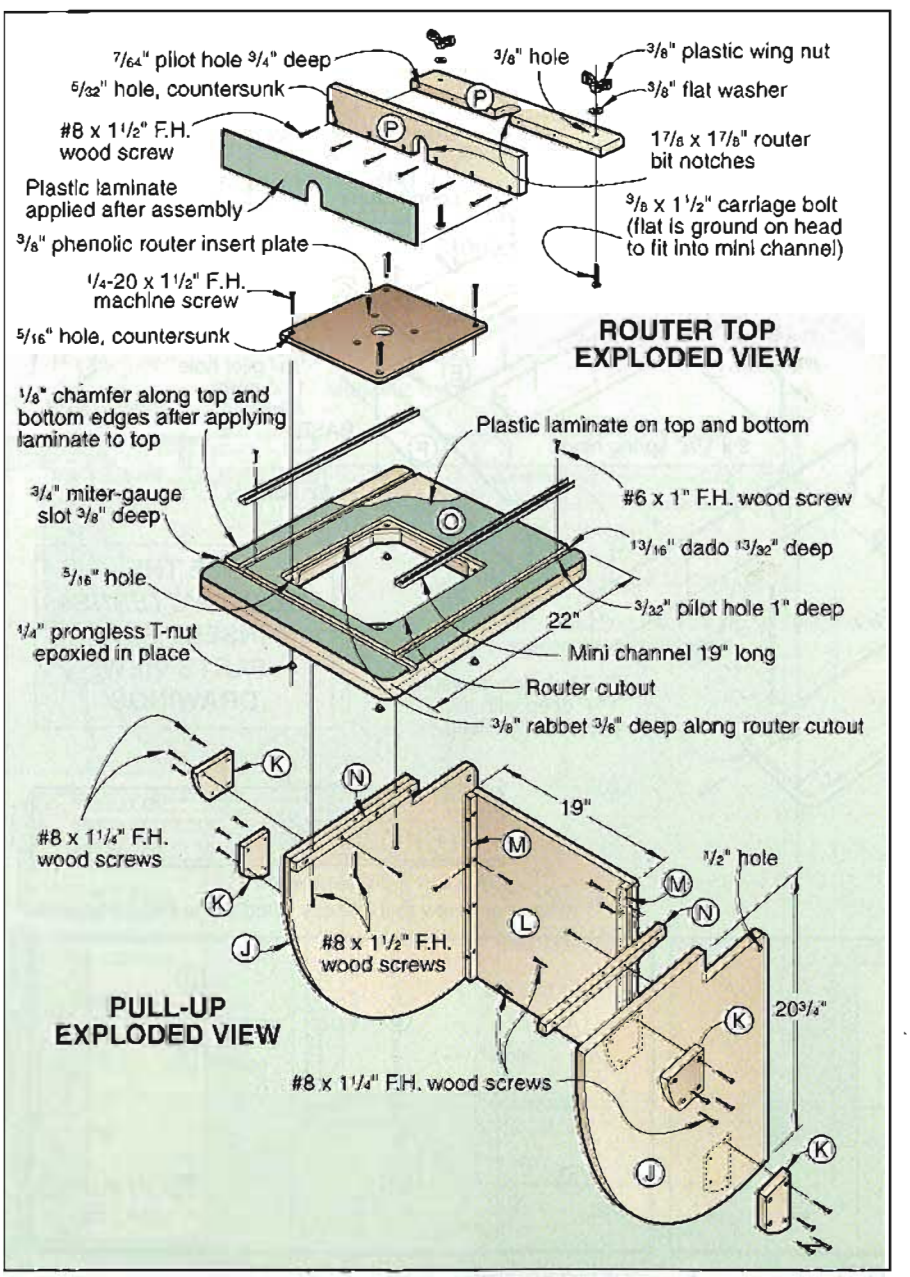
Next, add the router tabletop

1 Cut two pieces of ¾" MDF for the router top (O) to size plus 1" in length and width. Glue and clamp them together face-to-face. Later, trim the top to finished size, radiusing the corners where shown on the Router Tabletop on the Parts View.

2 Using contact cement, apply plastic laminate cut slightly oversized to the top and bottom surfaces of the router tabletop (O). Trim the laminate with a flush trim bit, and then rout a ⅛" chamfer along the top and bottom edges.

3 Cut or rout the miter-gauge and mini-channel grooves in the tabletop where dimensioned on the drawing. Cut the grooves to match the width of your miter gauge and mini channel. (We used B-Line System 72 mini channel available at most electrical supply outlets. Or, see the Buying Guide for our mail-order source.)

Note: *When tucking the router tabletop under the workbench, it's important to have the router plate (with the router attached) secured to the tabletop so it doesn't fall out. For that reason, we secured the plate to the tabletop with screws and T-nuts. See the Buying Guide for our source of the router plate and hardware.*


7/64" pilot hole 3/4" deep
5/32" hole, countersunk
#8 x 1 1/2" F.H. wood screw
Plastic laminate applied after assembly
3/8" phenolic router insert plate
1/4-20 x 1 1/2" F.H. machine screw
5/16" hole, countersunk
3/8" hole
3/8" plastic wing nut
3/8" flat washer
1 7/8 x 1 7/8" router bit notches
3/8 x 1 1/2" carriage bolt (flat is ground on head to fit into mini channel)
ROUTER TOP EXPLODED VIEW
1/8" chamfer along top and bottom edges after applying laminate to top
Plastic laminate on top and bottom
3/4" miter-gauge slot 3/8" deep
#6 x 1" F.H. wood screw
13/16" dado 13/32" deep
5/16" hole
3/32" pilot hole 1" deep
22"
1/4" prongless T-nut epoxied in place
Mini channel 19" long
Router cutout
3/8" rabbet 3/8" deep along router cutout
#8 x 1 1/4" F.H. wood screws
19"
1/2" hole
#8 x 1 1/2" F.H. wood screws
PULL-UP EXPLODED VIEW
20 3/4"
#8 x 1 1/4" F.H. wood screws

4 The router plate we used and listed in the Buying Guide is advertised as 12" square. The plate actually measures a bit less. Using your tablesaw, cut adjoining edges, trimming the plate to 11¾" square.

5 See the article on *page 18 of issue 102 (Winter 1997).* for information on forming the router plate recess in the tabletop (O).

6 Mark the centerpoints and use your drill press to drill 5/16" holes in the corners of the router plate, ¾" in from the corners. Center the router plate in the recess, and use the holes as guides to drill 5/16" holes through the corners of the recess in the tabletop (O).

7 Using epoxy, adhere a ¼" prongless T-nut into each 5/16" hole on the bottom side of the tabletop.

8 Mark the centerpoint on the router plate, and bore a 1½" hole (or to a diameter just slightly larger than the diameter of your largest-diameter router bit) through the center of the plate.

9 Countersink the 5/16" holes in the router plate to house the ¼–20×1½" flathead machine screws.

10 Remove the base plate from

your router. Using the holes in your base plate as guides, drill corresponding holes in the router plate. Countersink the holes. Fasten your router to the router plate. Insert the router and plate into the router-table opening, and secure with the machine screws.

Add a fence to the router tabletop

1 Using the Router Top Exploded View drawing and the Fence and Fence Base on the Parts View for reference, cut the fence and fence base pieces (P) to size. Cut a U-shaped notch in each, and drill the holes in each where dimensioned.

2 Glue and screw the two pieces together in the configuration shown on the Router Top Exploded View to form the fence.

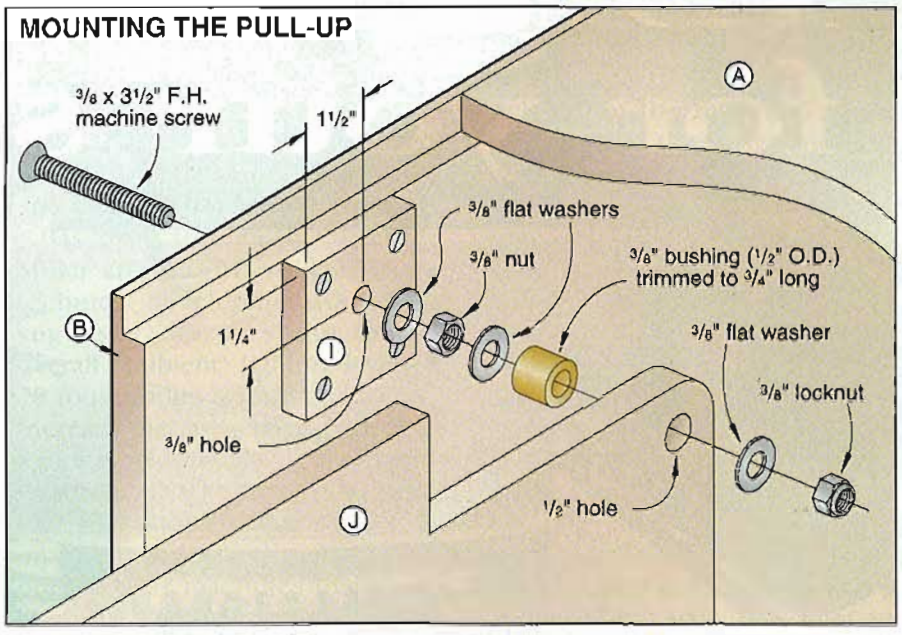
3 Use contact cement to apply plastic laminate to the front of the fence. Trim the laminate flush.

4 Cut two 19" lengths of mini channel and drill countersunk holes for #6×1" flathead screws. Clamp the channel in place, drill pilot holes into the top (O), and drive the screws.

Finish it up, and add the router

1 Remove the doors and all previously attached hardware from the carcase. Prime the carcase, doors, base, foot pedal, and pull-up parts with an oil-based primer. Apply the paint. See our method for obtaining the hammered paint look in the November 1997 issue of *WOOD®* magazine. (We used Mid Green Hammered Metallic Finish for the carcase, doors, and pull-up parts and Gray Hammered Metallic Finish for the base and foot pedal.) Finish the exposed MDF surfaces of the router top and fence with polyurethane.

2 Drill the mounting holes, and screw the carcase assembly to the base, locating the back edge of the base ¾" in from the back edge of the carcase. See the Side Section View drawing for reference.



3 Mount the spring hinges to the foot pedal (H) and then the foot pedal/spring hinges to the base front (E).

4 Mount the chain bolts, and feed the chains through the ½" holes in the bottom (A) and into the slots in the foot pedal. Let the chains hang slack, and run the #8×2½" wood screws into the pre-drilled holes in the edges of the foot pedal, securing the chains to the pedal. Check to see that both chain bolts operate simultaneously. Slight differences in the lengths of the chains can be equalized by removing the short chain, clamping one end of the chain in a vise and stretching the chain by pulling on the other end with pliers. Make sure that the chain bolts are fully extended when the foot pedal is in the up position. With the bolts working properly, cut the excess chain off below the foot pedal.

5 Using the Mounting the Pull-Up drawing *above* for reference, install the ⅜×3½" flathead machine screws through the sides (B) and spacers (I). Secure each with a washer and nut. Hang the support arms (J) on the bolts with additional washers and nuts where shown on the drawing. Rotate the arms into the up position, and attach the back (L) between the arms. Step on the foot pedal to release the pull-up assembly to check the movement. A little grease applied to the curved edge of each latch block (K) will smooth the operation of the pull-up assembly.

Note: *With the carcase unsecured, installation of the router tabletop will cause the whole assembly to tip forward. The carcase must be temporarily weighted or secured to prevent this.*

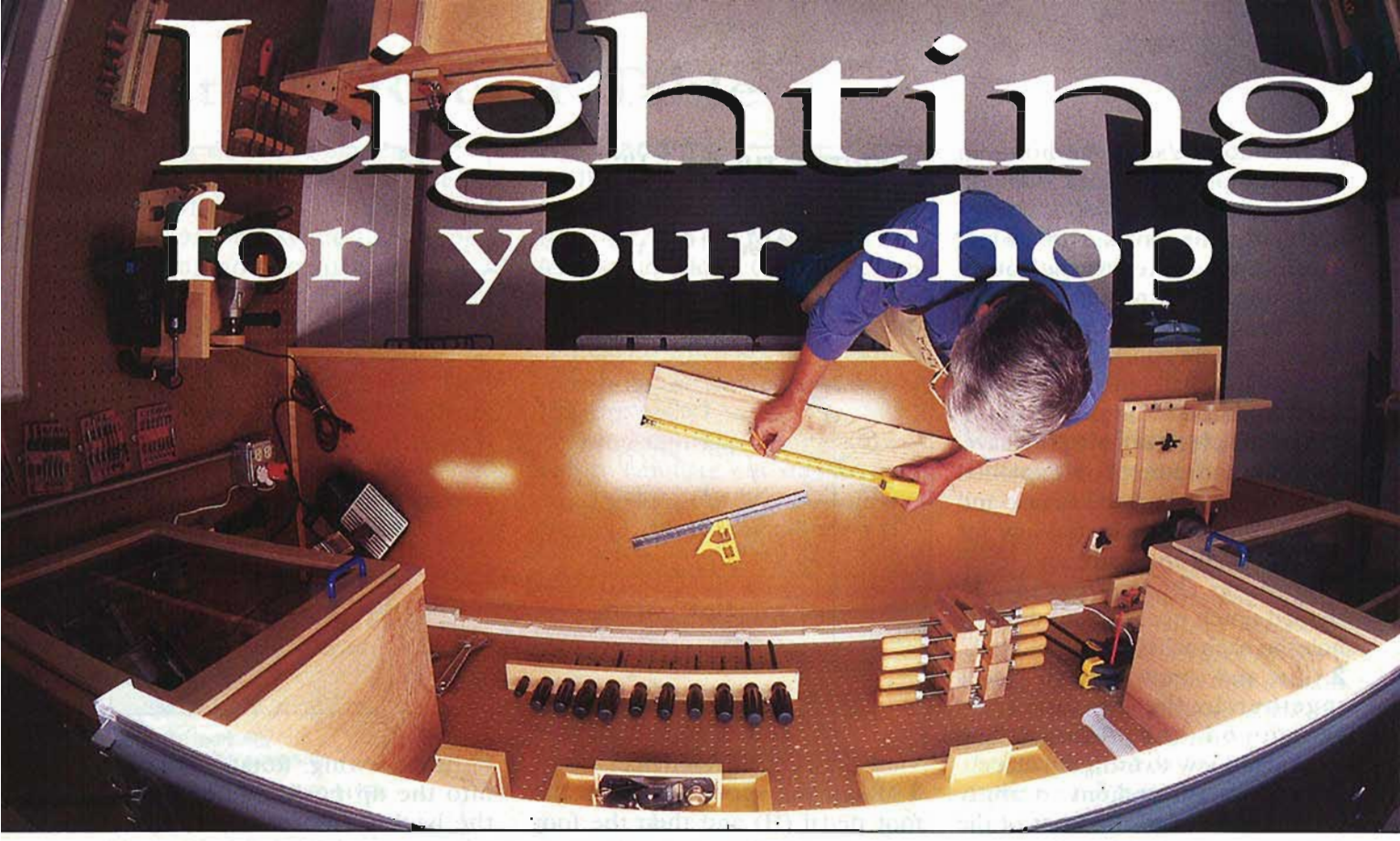
6 Clamp the router tabletop (O) to the support arms (J), centered side-to-side. Screw the router tabletop in place.

7 File two flat areas opposite each other on the heads of two ⅜×1½" carriage bolts so they will slide into the mini channel in the router top. Insert them into the mini channel and into the bottom of the fence base (P). Secure them loosely with a washer and wing nut. Check the fit of the fence assembly on the router top.

8 Position the cabinet under the workbench top, and screw it to the wall and the workbench top.

Written by Marlen Kemmet Project Design: Jan Hale Svec Illustrations: Kim Downing; Lorna Johnson Photographs: Hopkins Associates

Lighting for your shop



Are you shedding enough light on your woodworking? Chances are you're not.

Nothing makes you feel as comfortable and safe working in your shop as good lighting. So just what does good lighting amount to?

Lighting experts, such as Professor Naomi Miller at the Lighting Research Center of Rensselaer Polytechnic Institute in Troy, New York, say that high-quality lighting provides a visually comfortable environment, with little glare, that makes performing tasks easier. "But there's no easy way to arrive at a universal formula for workshop lighting because it depends very much on the type of equipment you're using, the shape of your workshop, and where you perform tasks," comments Miller. "Lighting needs also vary tremendously with a person's age [see *below*]." Lighting researchers do agree on some basic guidelines, though.

The type of light you use makes a difference

Generally, you want to install fluorescent fixtures overhead in your

Older woodworkers need more light

Failing vision and other eye deterioration problems aside, studies by gerontologists indicate that your need for light drastically increases as you grow older. Research shows that to keep the same reading speed you had at 20 years of age takes 50% more light when you reach 50. At age 60, twice as much. And at 80, three times more light. Glare also bothers older people a lot more. And a gradual yellowing of the lenses in your eyes changes your color perception somewhat, making it more difficult to discern closely related colors in the blue-green end of the color spectrum.

This all means that if you're 50 or older, you need more lighting help. Here are some tips:

- Increase overhead illumination. You can do this by replacing standard 2-lamp fluorescent fixtures with 3- or 4-lamp ones to beef up lighting without much extra rewiring.
- Reduce glare by replacing (or retrofitting) fixtures that have bare fluorescents with ones featuring diffusing covers.
- Install warmer Spec 30 (SP30 or Designer 30) fluorescent tubes in overhead fixtures to correct for color.

shop because they produce better contrast, practically no shadows, and less glare for superior visibility. They're also three to four times more efficient than incandescents and last 10 times longer.

However, incandescents have a place in the shop, too. As task lighting, the shadows their bulbs produce help more clearly define detail work like carving and operations such as drilling and scrollsawing. But for general lighting, they produce too much glare. (Incandescent reflector lamps make better use of light than standard A-type, round bulbs because they direct it. They also render color better.)

How much light do you really need?

According to the Illuminating Engineering Society of North America (IESNA), the amount of light (measured in foot-candles, see glossary of terms *right*) required for a visual task increases with its difficulty. For instance, IESNA suggests that 30-50 foot-candles are adequate overall illumination for working around the home. Scrollsawing for extended periods of time, though, requires 100-200 foot-candles.

Based on this, both Professor Miller and Rita Harrold, IESNA's technical development director, suggest that you shoot for an overall (ambient) lighting level of 75 foot-candles with fluorescents. Increase that as needed with task lighting by 100-watt incandescent fixtures. (It's important to note that your shop lighting should be on a separate circuit, just in case one of your machines overloads and trips a breaker.)

How does this lighting level translate into fixtures needed? Professor Miller cites the fact that not all the light produced by a lamp reaches the work level. "Some is absorbed by walls and ceiling, and some lost in the inefficiency of the fixture. To compensate, use three two-lamp, 40-watt, 4' fluorescent fixtures per 100 square feet (10×10') of workspace, locating them above work centers." (See the chart, *below left*, for general lighting requirements of different-sized shops.)

But before you visit your electrical supplier, Professor Miller has some more advice. "It's a good idea to use electronic ballasts with your fluorescent lamps because they don't flicker and cause a strobe effect with running woodworking machines. Then, too, it's great to have a light fixture that throws some illumination onto the ceiling and walls. This gives you balanced light that makes the shop more visually comfortable. You should also paint walls and ceilings white to maximize energy efficiency."

CHECK YOUR LIGHTING NEEDS

Shop dimensions in feet*	Number of fixtures needed**	Total watts
10×10	3	240
10×15	4.5	360
10×20	6	480
15×15	7	560
15×20	9	720
20×20	12	960
20×30	18	1,440
30×30	27	2,160
30×40	36	2,880
40×40	48	3,840

* Dimensions assume an 8' ceiling height

** Standard 4', two 40-watt lamp, fluorescent fixtures or equivalent in larger fixtures to get 75-foot-candles

Glossary of lighting terms

Ballast. An electrical device used in fluorescent and high-intensity discharge fixtures to furnish the necessary starting voltage and maintenance current to the lamp for proper lighting performance. Electronic ballasts transform current at high frequency to operate discharge lamps, such as fluorescents, without flickering.

Fluorescent lamp. A bulb which produces light by passing electric current through a metallic gas to excite special chemicals called phosphors, causing them to glow or "fluoresce." The glowing phosphors coat the inside of the tube, converting about 80% of the electricity into light. A standard 40-watt, 4' fluorescent bulb puts out about 2,700 lumens.

Foot-candle. The quantity of light reaching a surface; equal to the number of lumens reaching a surface divided by the square footage of the surface, e.g. one lumen over one square foot equals one foot-candle, and a 100-foot-candle level equals 10,000 lumens for every 100 square feet of shop space.

Incandescent lamp. A bulb which uses a tiny wire called a filament that glows white hot when electricity passes through it. Ten percent of the electricity is converted into light, the rest heat. A 100-watt incandescent lamp produces about 1,750 lumens.

Lumen. The measurement of light output from a lamp.

Watt. A unit of electrical power produced by a current of one ampere across a potential difference of one volt.

Written by Peter J. Stephano with research assistance from Iowa State University Extension Service's Department of Human Development and Family Studies
Photograph: Hetherington Photography

16-Sided

Ebony inlays highlight this tapered, staved vase. You can either turn the vase for a smooth, round look, shown *far left*, or skip the lathe work and display this faceted version. And as a bonus, you can utilize the jigs and techniques here to build a drum like the one shown on *page 37*, too.

Showpiece

Whether turned or faceted, this stave vase looks great

Start with the stave blanks

1 For the side and top staves (A and B), cut 16 maple or white oak blanks to ¾×1 7/16×14 5/8". At the same time, cut four extra blanks the same size from scrapwood. Also cut half-a-dozen ¾×1 7/16×30" scrapwood pieces to test saw setups later. You could cut these test pieces from particleboard, MDF, or solid stock.

2 Install an auxiliary fence on your tablesaw's miter gauge, and set a stopblock at 3 5/16". Saw the top off the 14 5/8"-long pieces. Set aside the short cutoffs; they're blanks for the top staves (B). As you cut the good pieces, put strips of masking tape adjacent to the mating ends, and number them, as shown on the Staves drawing. This way, you can keep the top and side blanks together for grain continuity. Mark the scrapwood staves, too, for later reference.

3 Tilt your tablesaw blade 7.8° from vertical. An adjustable triangle (shown in the large photo on *page 74* and available at art-supply stores) will help you set the angle accurately. Just lay the triangle on the End Bevel Guide drawing on *page 73*. Adjust the triangle's legs to match the angle shown, then gauge the blade angle with the triangle.

Set a stopblock at 11" on the miter gauge, and make the cut across the mating end of each side stave (the numbered end on the good pieces), where shown on the Staves drawing.

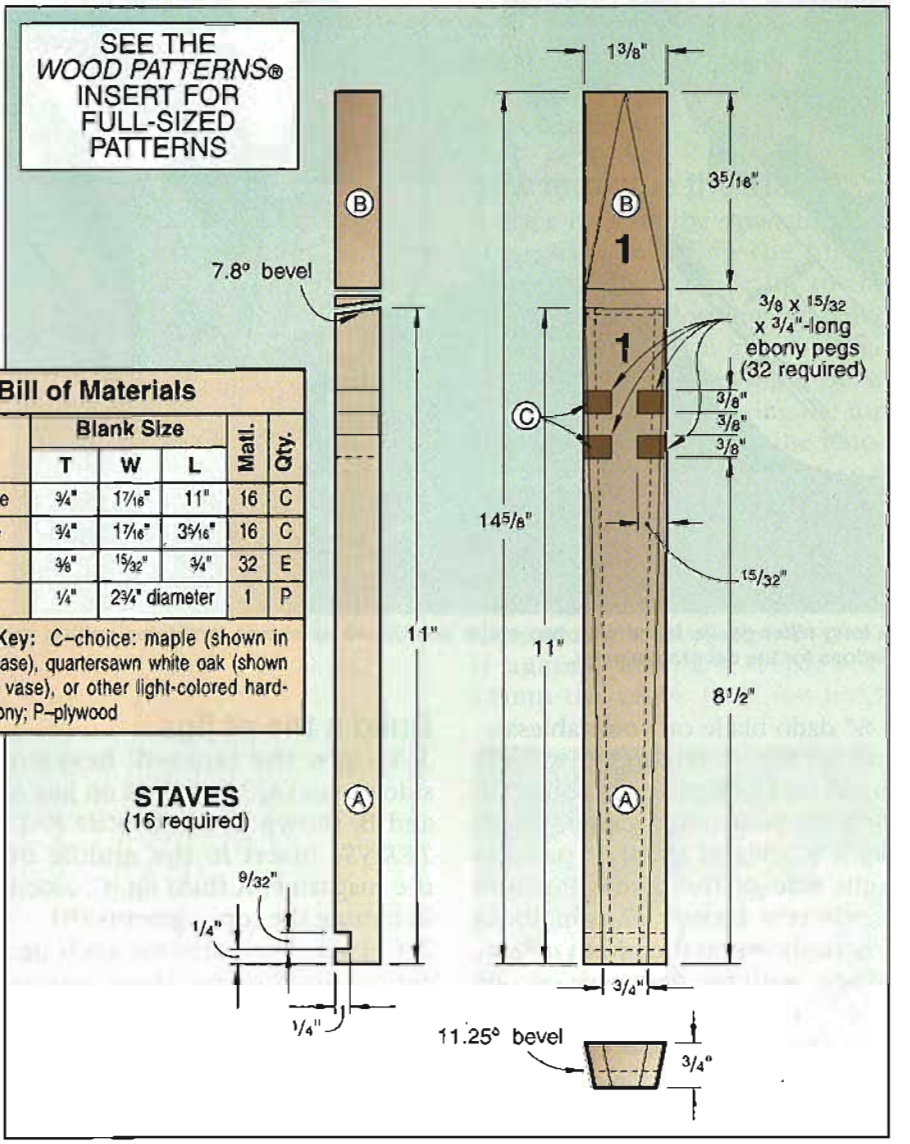
4 Return the blade to vertical. Install a dado blade set up to make a cut 1/32" wider than the thickness of the plywood you will use for the vase bottom (D). Adjust the cutting depth to ¼". Then, using a stopblock, saw a dado on the inside face (the short side) ¼" up from the bottom (the unbeveled end) of each side stave (A), shown in the Staves drawing.

SEE THE *WOOD PATTERNS®* INSERT FOR FULL-SIZED PATTERNS

Bill of Materials

Part	Blank Size T	W	L	Matl.	Qty.
A side stave	¾"	1 7/16"	11"	16	C
B top stave	¾"	1 7/16"	3 5/16"	16	C
C peg	⅜"	15/32"	¾"	32	E
D bottom	¼"	2¾" diameter		1	P

Materials Key: C–choice: maple (shown in closed-top vase), quartersawn white oak (shown in open-top vase), or other light-colored hardwood; E–ebony; P–plywood



Add the ebony pegs

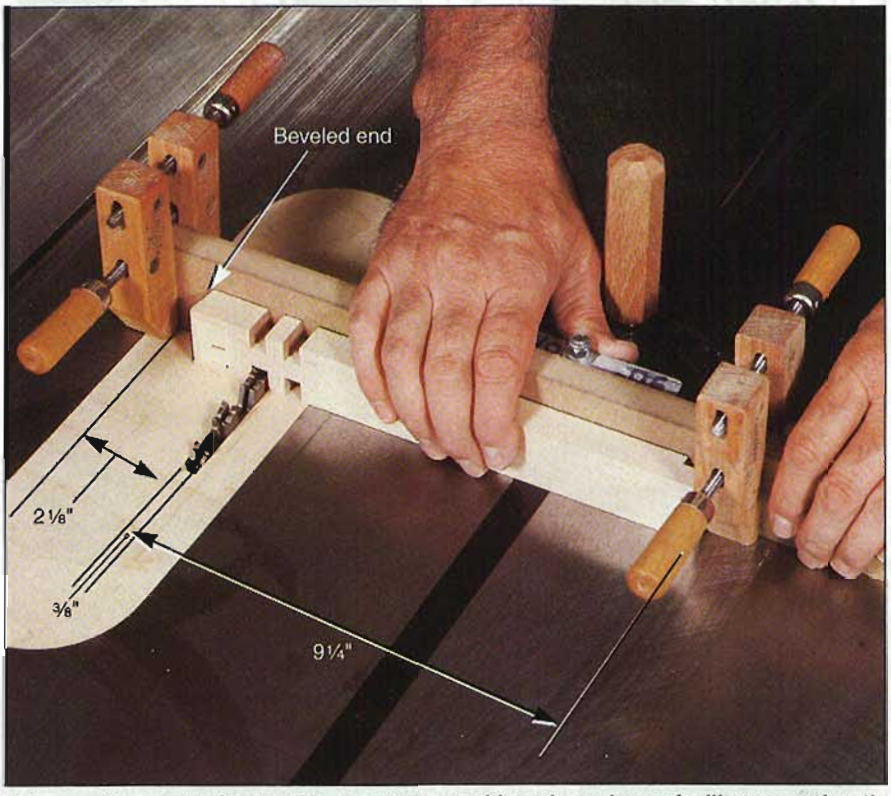
1 Cut the 32 decorative pegs (C) to the size shown in the Bill of Materials. For safety in sawing the pegs, install a zero-clearance insert in your saw's throat.

Rip 15/32"-wide strips from ⅜"-thick ebony, then crosscut the ¾"-long pegs from the longer strips, using a miter gauge with an auxiliary fence that supports the stock all the way to the blade.

2 Next, cut notches to receive the pegs in both edges of every other stave (the good ones only). We slotted the odd-numbered staves. To cut the notches, install

Continued

16-Sided Showpiece



A long miter-gauge fence with two stops positioned as shown facilitates cutting the dadoes for the decorative pegs.

a ⅜" dado blade on your tablesaw, and set the cutting depth to 15/32". Install an auxiliary fence about 16" long on your miter gauge, allowing it to extend about 5" past the right side of the blade. Position handscrew clamps or stopblocks where shown in the photo *above*.

Then, with the first stave on one edge, cut the two notches, one with the beveled end against the stop closer to the blade and one with the straight end against the stop farther from the blade. Repeat the two cuts on the other edge. Cut peg notches in the remaining odd-numbered staves the same way.

3 Glue the pegs into the notches. After the glue dries, sand the faces and edges flush as necessary. Remove the taped-on number to sand the outside face, of course, but replace it afterward.

4 Lay out a 2¾"-diameter circle on ¼" plywood, and bandsaw or scrollsaw it for the bottom (D).

Build a trio of jigs

1 To saw the tapered, beveled side staves (A), we relied on jigs A and B, shown in the *WOOD PATTERNS®* insert in the middle of the magazine. A third jig, C, aided in cutting the top segments (B).

2 Cut out the parts for each jig, referring to the dimensions shown on the jig drawings in the *WOOD PATTERNS* insert. You could cut them from Baltic birch plywood, MDF, or particleboard.

Tilt your tablesaw's blade 11.25°, and bevel one edge of the alignment block for Jig B where shown. Set the tilt angle using an adjustable triangle and the Edge Bevel Guide drawing.

Make two hold-down blocks as shown. You need only one pair; the same ones fit all three jigs.

3 Adhere a copy of each jig's pattern to its base. Drill ¼" holes where indicated by the wing nuts. Bore ⅜" counterbores ¼" deep on the underside of the base.

Position the alignment blocks on each jig where shown, and attach with screws. (We left the patterns in place on the jig bases, and attached the parts right over them to ensure accurate positioning.) Drill the ¼" holes on through the alignment blocks.

4 Where the pattern indicates sandpaper for nonskid surfaces, cut away the paper pattern. Stick strips of 100-grit self-adhesive sandpaper in those areas.

5 Install the hold-down blocks on Jig A with two ¼×3" carriage bolts and wing nuts. Place a washer between each wing nut and the hold-down block.

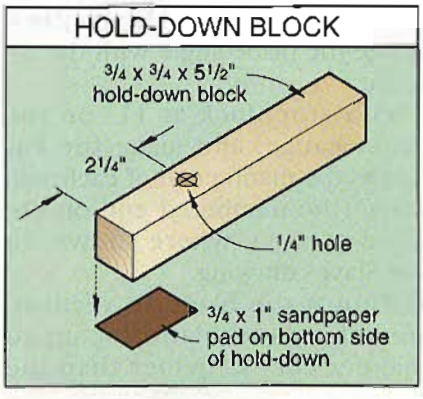
Set up your tablesaw

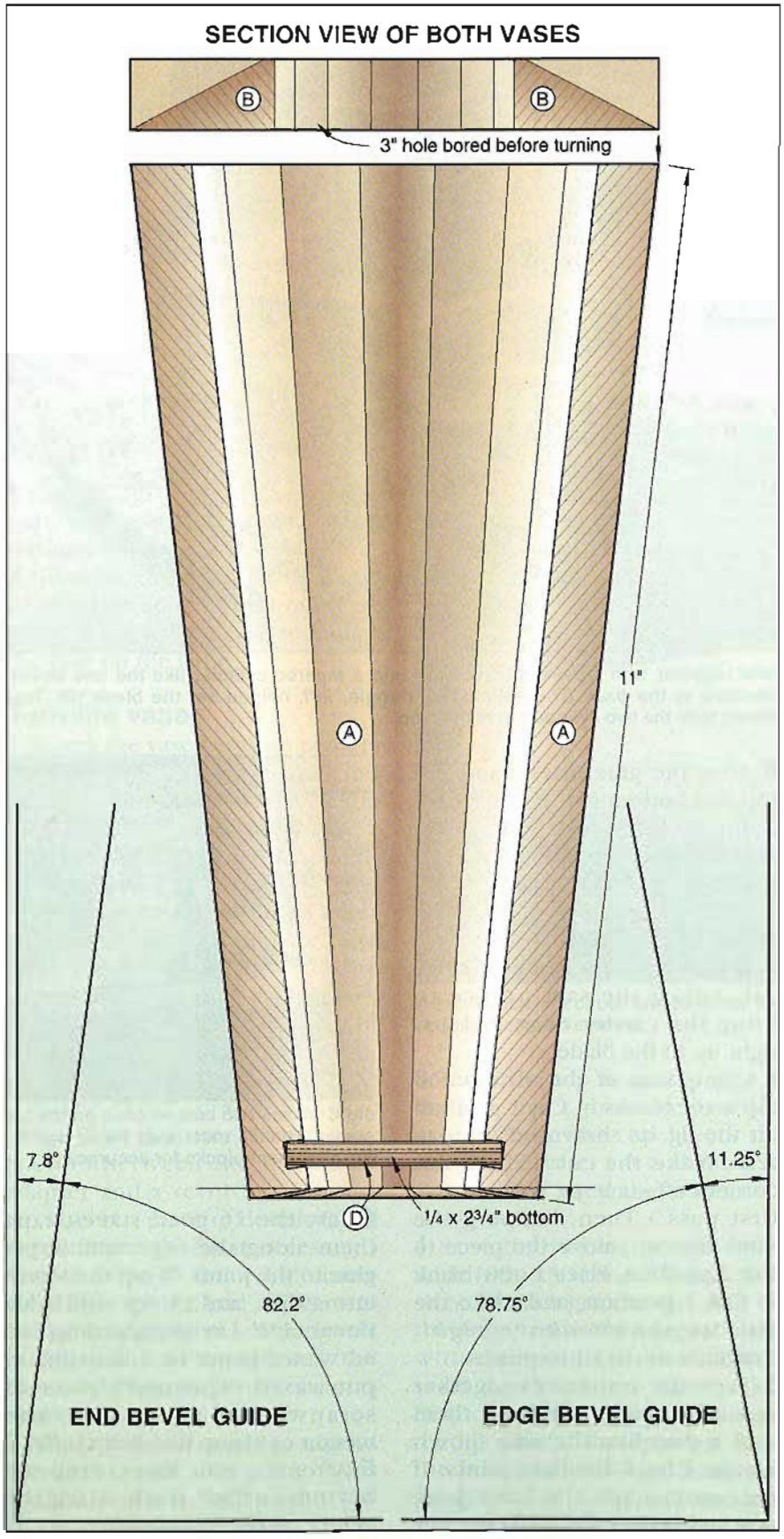
1 Install a zero-clearance insert in your tablesaw's throat. Tilt the blade to 11.25°, and set the saw's fence to leave a face 1 11/32" wide on ¾"-thick material. Rip one edge on two pieces of your 30"-long scrap material with this setting.

2 Move the fence ⅛" closer to the blade. Keeping the same face of the material up, rip the opposite edge. Leave the saw's tilt setting.

3 Using a different saw—handsaw, bandsaw, or whatever else you might have—cut the beveled scrapwood into sections about 3" long. You'll need 16 of them.

4 Lay two strips of masking tape about 2' long parallel and about 1½" apart on your benchtop, sticky side up. Then, line up the test wedges on the tape, wide face down, edges tightly together.





5 With all 16 in place, roll them up into a cylinder. Look at the ends to check the joints. If the pieces do not fit together tightly, adjust the saw tilt slightly, and repeat the process. (We made three test cuts before we were satisfied with the joints.) Don't change the blade tilt once you've set it correctly.

Saw and glue the staves

1 Place Jig A on the saw table, the stave carrier facing the blade. Bring the saw's fence up to the back of the jig. Position the fence so the blade will cut into the edge of the jig's base, sawing a bevel along the edge but leaving the top surface full width. Lock the fence in this position, and don't move it until you have cut all the staves with Jig A.

2 Place a scrapwood stave blank in the jig. Put the bevel-cut end of the stave—the marked end—firmly against the jig's stopblock. Clamp the blank with the hold-

With the bevel angle established by the 11.25° blade tilt, Jig A rips one edge of the tapered, beveled staves.

down blocks, and saw as shown *above*. Cut the three remaining scrapwood staves and the 16 good ones this way, keeping the good staves in numerical order.

3 Now, change to Jig B to cut the other edge of each stave. Run the jig through the saw to bevel the edge of the base. Then, position

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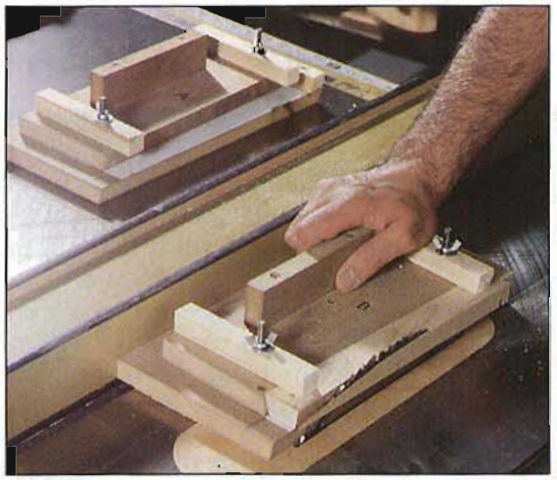


After making the first cut on the staves with Jig A, cut the other edge on Jig B to bring the staves to finished size.

Held together with tape, the staves roll into a tapered cylinder like the one shown standing at the *back*. The adjustable triangle, *left*, helped set the blade tilt. Test staves form the two cylinders and the disc.

one of the scrapwood staves on the jig, its beveled edge against the beveled edge of the alignment block. The dadoed end of the stave should rest against the stop-block. Clamp the stave, and saw it, as shown *above*.

4 Measure the wide face of the stave. It should be 1 5/16" wide at the beveled end and ¾" wide at the dadoed end. If not, adjust the fence, and make another test cut on a scrapwood stave. Once the dimensions are correct, saw the 16 good staves.

5 Align the staves in order, and tape them together, as you did with the test pieces earlier. (We used strapping tape this time—it's stronger than masking tape.)

6 Place the bottom (D) in the dadoes, and roll the staves into a tapered cylinder, as shown in the photo *above right*. If the bottom is too large, sand it to fit. Adjust the staves as necessary to bring the top flush.

7 Unroll the assembly. Brush glue onto the edges. (We glued our vase with white glue because it allows a longer open time for making final adjustments. We recommend using new glue. Old stuff may have thickened, which could make it difficult to pull this many joints together.) Clamp with additional wraps of tape. Remove glue squeeze-out on the inside with a damp rag.

8 After the glue dries, sand the top and bottom flat. If you're not going to lathe-turn your vase, skip the next two sections and go to Finish Your Vase now.

Now, build the top

1 Return the saw blade to vertical. Adjust the saw's fence to bring the carrier edge of Jig C right up to the blade.

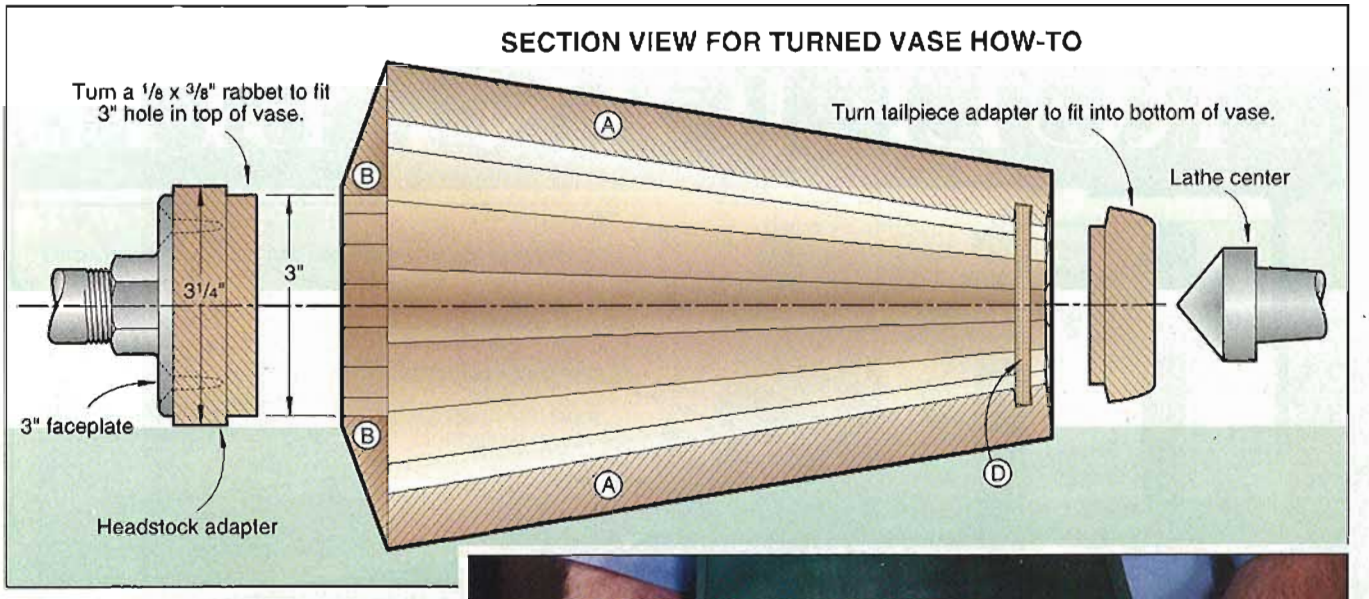
2 Clamp one of the scrapwood top stave blanks in Cut 1 position on the jig, as shown on the pattern. Make the cut. (You'll cut corners off some jig parts in this first pass.) Then, keeping the same face up, move the piece to Cut 2 position. Place a new blank in Cut 1 position, and make the cut, as shown *above right*. Continue to cut all 16 pieces.

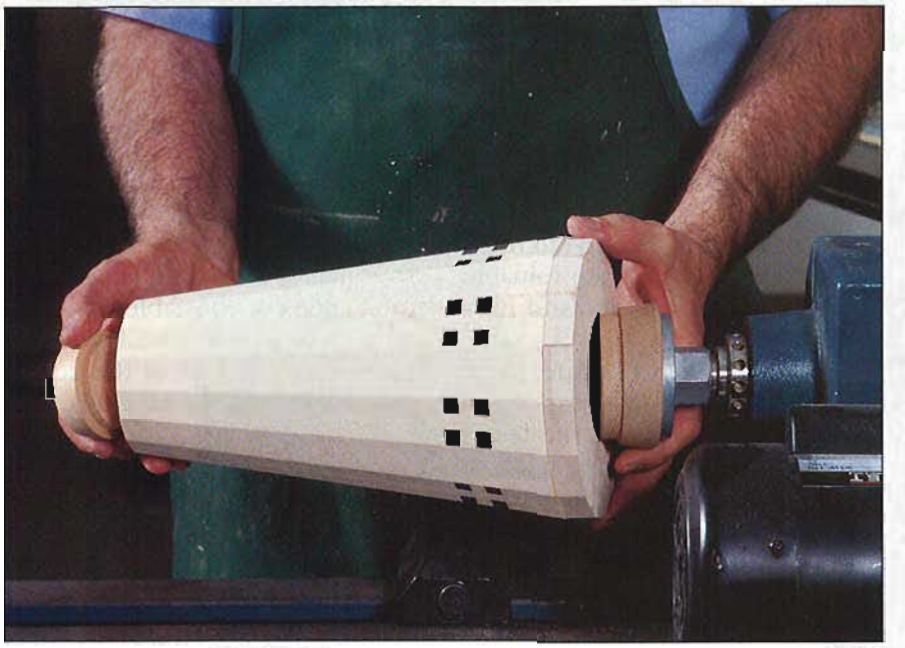
3 Tape the test staves together around the edge, and roll them into a disc like the one shown *above*. Check for tight joints. If necessary, adjust the fence position and make more trial cuts.

Jig C makes two cuts at once on the top staves. Blanks must seat firmly against the alignment blocks for accuracy.

4 Saw the 16 good staves, tape them along the edge, and apply glue to the joints. Wrap the staves into a disc, and clamp with additional tape. Lay the glued-up top on waxed paper on a flat surface, put waxed paper and a piece of scrapwood on top of it, and weight or clamp it to keep it flat.

5 After the glue dries, sand the bottom surface flush. Mark the center on the top surface.





A headstock jam chuck and tailstock center adapter make it easy to mount the glued-up vase between centers.

6 Chuck a 3" holesaw or circle cutter in your drill press. Bore through the top at the center.

7 Glue the top to the vase body. Center the hole as accurately as possible—it will be used to mount the vase on the lathe.

Turn the vase

1 Mount the vase between centers for turning, using two turned adapters like those shown in the drawing *above* and photo *right*.

To turn the headstock adapter—a jam chuck—bandsaw a 3½" disc from 1½"-thick scrapwood. Center it on your 3-3½" faceplate, and attach it with screws. True the face, and turn it to 3¼" diameter. Then form a rabbet ⅜" long to fit snugly inside the top hole.

For the tailstock piece, bandsaw a 1-1½"-thick scrapwood disc about 3" in diameter. Chuck it by friction between the headstock adapter and a revolving tail center. (Insert a piece of double-faced tape between them if necessary.) Turn the disc to about 2¾" diameter. Then, on the end adjacent to the jam chuck, form a ¼"-long rabbet that will fit snugly into the recessed bottom of the vase as shown *above*.

2 With a bowl gouge, round down the vase. Keep the sides straight, and take light cuts in the vicinity of the ebony pegs.

3 Taper the top from the edge of the jam chuck to the edge of the vase. Where the top meets the side of the vase, cut a shallow V-groove. We used the point of a skew for this.

4 Sand the turning on the lathe with 100-, 150-, and 220-grit abrasives. At each grit change, shut off the lathe, and sand longitudinally with the same grit to eliminate scratches around the vase. Dismount the turning, and sand the lip around the opening. Sand the bottom flush—you can tape sandpaper to a flat surface, and slide the standing vase across it.

Finish your vase

1 Finish-sand with 320-grit paper. (If you didn't turn your vase, sand with 100-, 150-, and 220-grit first.) Clean off all dust.

2 Stain if desired. (We stained the oak vase shown with Minwax Wood Finish no. 211 provincial; the maple one has no stain.)

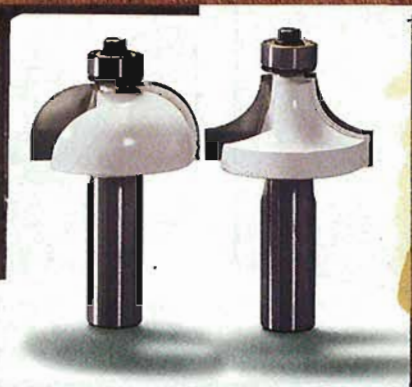
3 Apply clear oil finish. Follow the manufacturer's instructions.

4 When the finish dries, rub it out with a very fine (white) Scotch-Brite pad.

5 Finally, apply paste wax, following the label instructions. Buff with a soft cotton cloth.

Project Design: James R. Downing Photographs: Hetherington Photography Illustrations: Kim Downing; Lorna Johnson Written by Larry Johnston

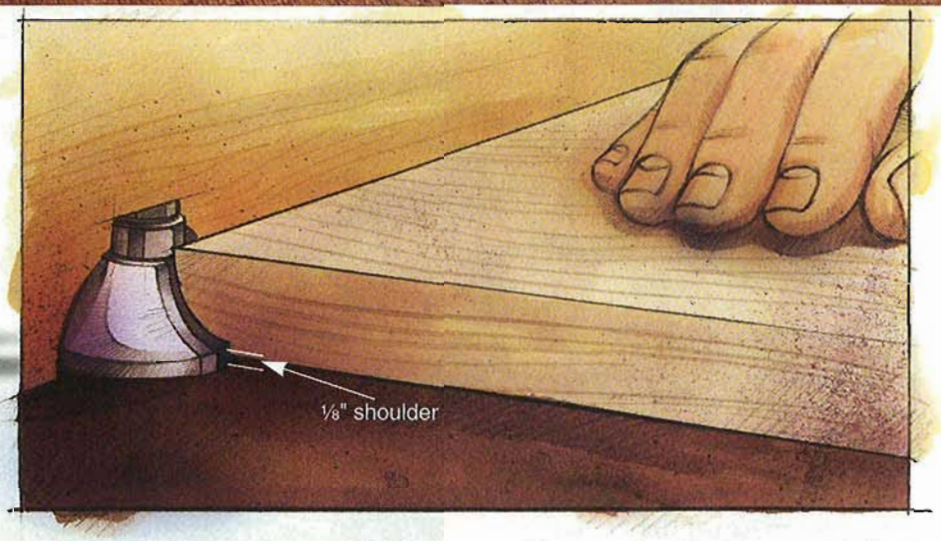
RULE JOINT BITS



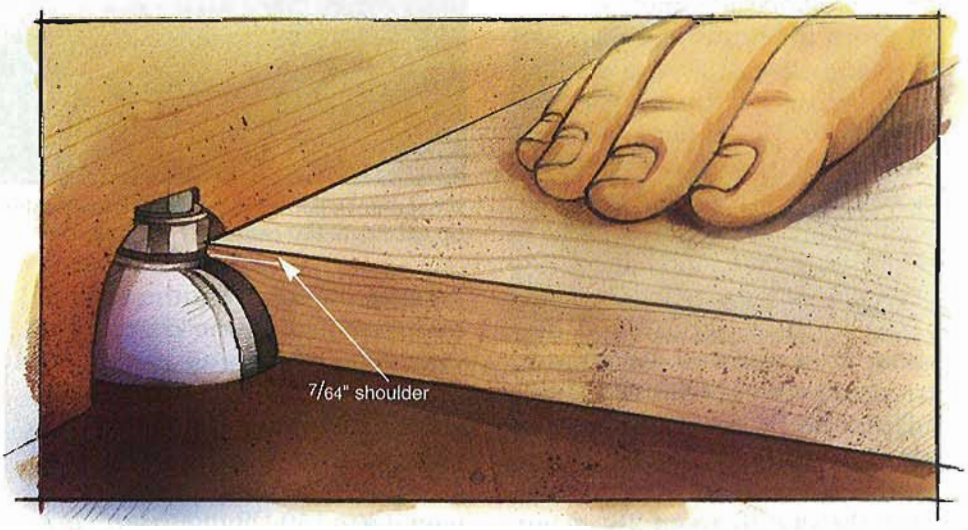
Like a chameleon that changes colors, a table with one or more drop-leafs quickly adapts to its environment. With the drop-leafs up, you have additional tabletop space. Fold them down and you gain valuable floor space around the table.

To make the rule joint between the tabletop and a drop-leaf, you cut the edges of the tabletop with a round-over bit, then use a cove bit of the same radius to cut the mating edge on the leaf. These bits are typically sold in matching "rule bit" or "drop-leaf table" sets like the one *above*. In this article, we'll use a ½"-radius set for ¾"-thick stock.

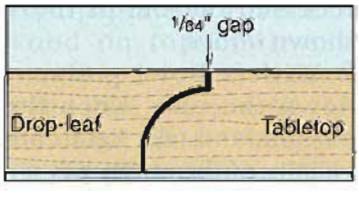
To complete the job, you'll also need a router table and two drop-leaf hinges for each leaf. These special hinges have one leaf that is longer than the other. Let's get started.



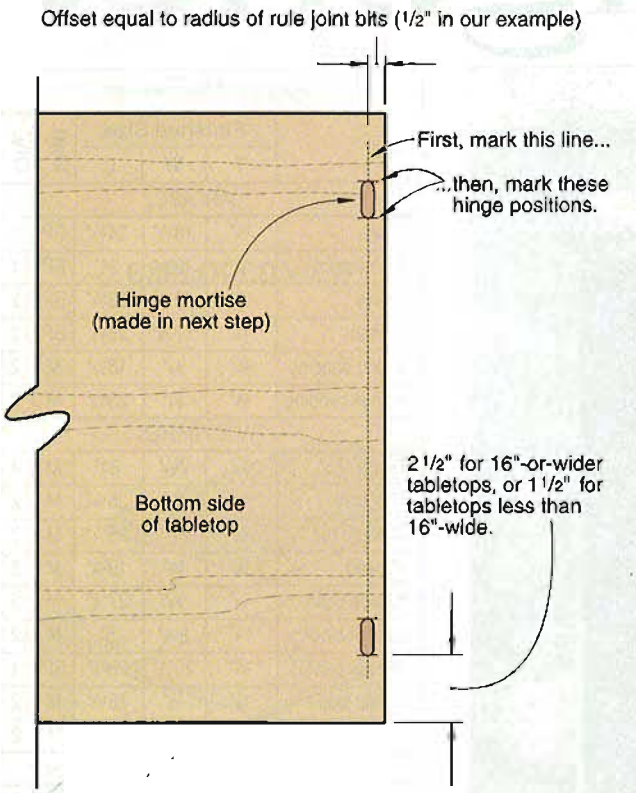
1 Install the round-over bit in your table-mounted router, and adjust the table's fence so the bit's bearing extends just barely beyond the fence (check this with a straightedge). Set the height of the bit so it makes a beading cut with a ⅛" shoulder as shown *above*. Rout all four edges of the tabletop, profiling the end-grain edges first. (If the table goes against a wall, you may elect not to rout the edge facing the wall.) Also, rout all of the edges of the drop-leaf, except for the edge that mates with the tabletop.

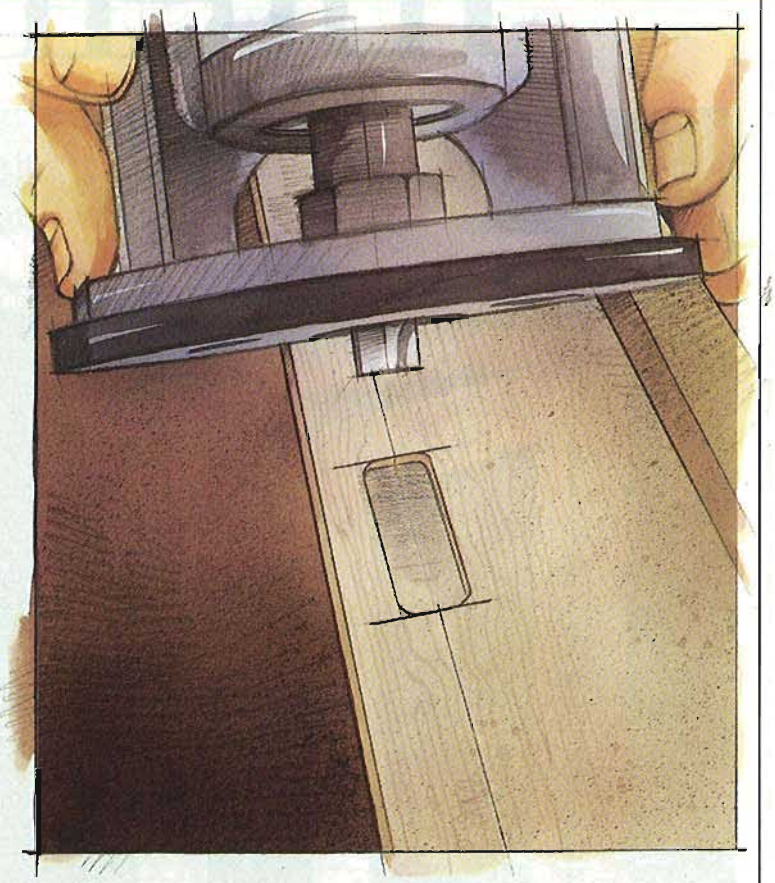


2 Install the cove bit with its bearing extending just beyond the fence. With a piece of scrap of the same thickness as your workpiece, make a cut that leaves a 7/64" shoulder. Adjust the height of the bit until the scrap piece and the tabletop have a uniform 1/64" gap between them as shown at *right*. You can check this gap by using a playing card as a type of feeler gauge. Rout the drop-leaf edge that mates with the tabletop.



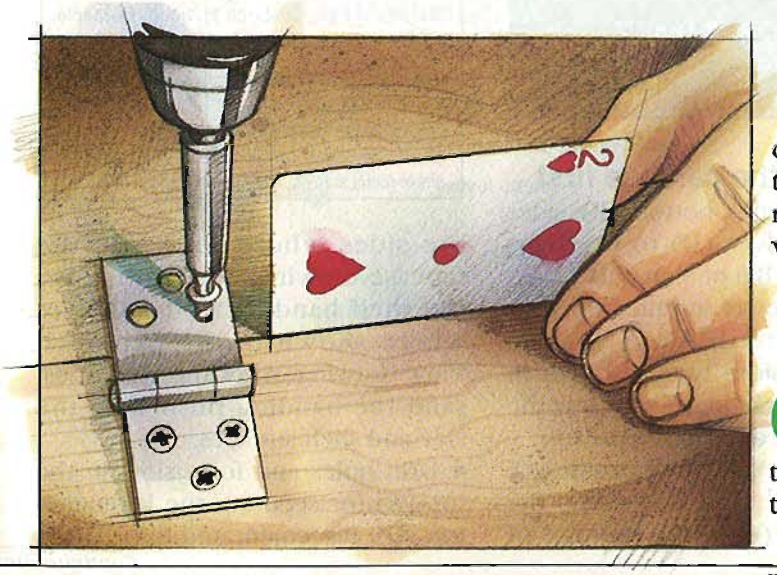
Your ticket to making a drop-leaf tabletop


Offset equal to radius of rule joint bits (1/2" in our example)
First, mark this line...
...then, mark these hinge positions.
Hinge mortise (made in next step)
Bottom side of tabletop
2 1/2" for 16"-or-wider tabletops, or 1 1/2" for tabletops less than 16"-wide.



3 With the bottom side of the table facing up, mark the position of the hinges by first drawing a line set back and parallel to the edge that mates with the drop-leaf as shown *above*. This setback should equal the radius of your rule-joint bits. Now, mark the position of the two hinges on this line as shown.

4 With a straight bit, rout a pair of mortises in the locations determined in the previous step. Rout the mortises deep and wide enough to accommodate the hinge's pivot. Use a straightedge clamped to the tabletop to guide the cut.



5 Align the tabletop and mating leaf, both bottom side up. To maintain the 1/64" gap between them, place playing cards as shown, just to the depth of their shoulders. Drill pilot holes and attach the hinges. (If you elect to mortise the hinge leafs, mark their locations, then rout and chisel out the waste area before screwing down the hinges.)

6 Add a means for supporting the drop leaf. You can buy metal brackets, add a piece of wood that slides out from beneath the tabletop, or build a gate-like leg that swings out from the base of the table.♠

Written by Bill Krier with Chuck Hedlund Illustrations: Brian Jensen

Counter Intelligence

A great-looking

Kitchen counter space—there's just never enough of it. But you can relieve some of the congestion by building this clever butcher block–topped cabinet. The 21¾×27¼" top allows you plenty of space for food preparation, and there's plenty of pots-and-pans storage beneath.

Bill of Materials					
Part	Finished Size			Matl.	Qty.
	T	W	L		
CARCASE					
A top	¾"	18½"	24¾"	BP	1
B bottom	¾"	18½"	24"	BP	1
C side	¾"	18½"	33¼"	BP	2
D shelf	¾"	17⅝"	23⅝"	BP	2
E side banding	¾"	¾"	18½"	M	2
F shelf banding	¾"	¾"	23⅝"	M	2
FACE FRAMES					
G stile	¾"	2¾"	34"	M	4
H top rail	¾"	2½"	25¼"	M	2
I bottom rail	¾"	4"	25¼"	M	2
J* bead	¼"	¾"	19¾"	M	2
K* side bead	¼"	¾"	27½"	M	2
L catch block	¾"	2¼"	5"	M	2
M back panel	¼"	20⅝"	28⅜"	BP	1
N side stop	¼"	½"	28½"	M	2
O stop	¼"	½"	19¾"	M	2
DOOR					
P stile	¾"	3"	26⅞"	M	2
Q rail	¾"	3"	19⅛"	M	2
R panel	¼"	14"	21¾"	BP	1
S side stop	¼"	½"	21⅞"	M	2
T stop	¼"	½"	13⅛"	M	2
LAMINATED TOP					
U* butcher block	1½"	21¾"	27¼"	LM	1

*Make oversize initially (see instructions)

Materials Key: BP–birch plywood, M–maple, LM–laminated maple

Supplies: #8×1½" and 2" flathead wood screws, ⅜" flat washers, *⅜×2½" bronze no-mortise hinges, brass ball catches, brass shelf pins, 1¾" Shaker knob, 2½" swivel casters, ¼×¾" panhead sheet-metal screws, #17×1" wire brads.

Construct the carcase first

1 Cut the top (A), bottom (B), sides (C), and shelves (D) to the sizes shown in the Bill of Materials.

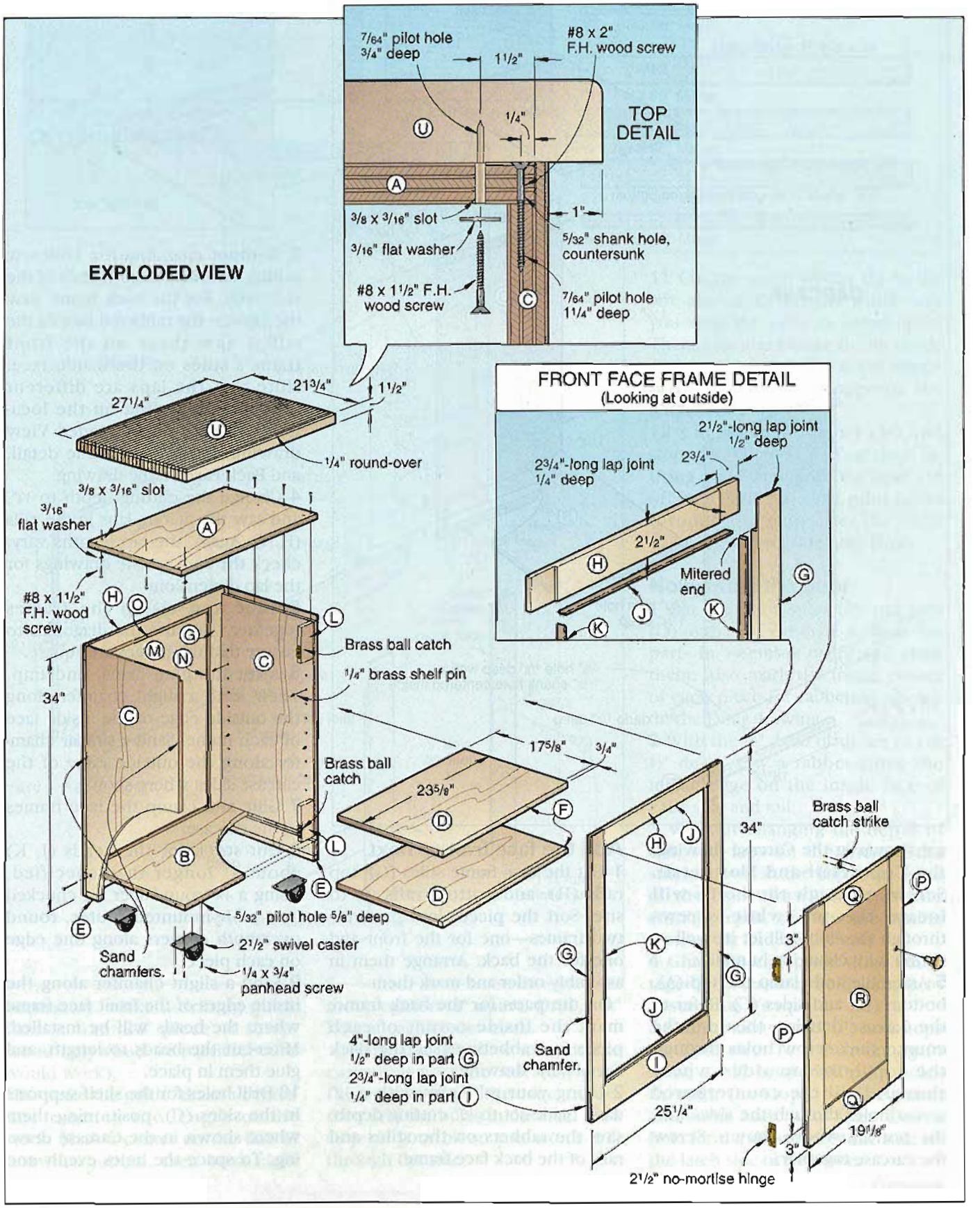
2 With a dado set installed on your tablesaw, cut a ¾" dado ⅛" deep across both sides where shown in the Carcase drawing. Then, saw the ¾" rabbets ½" deep along the top.

3 Cut the side and shelf banding (E and F) to size. Glue and clamp the side banding (E) to the bottoms of the sides where shown in the Carcase drawing. Similarly, fasten the shelf banding to the shelves where shown in the Exploded View drawing. After the glue dries, sand the banding flush with the side and shelf surfaces.

4 Drill holes and form slots in the top (A) for securing the laminated top (U). Placement and dimensions

Continued

roll-around cabinet with a bonus



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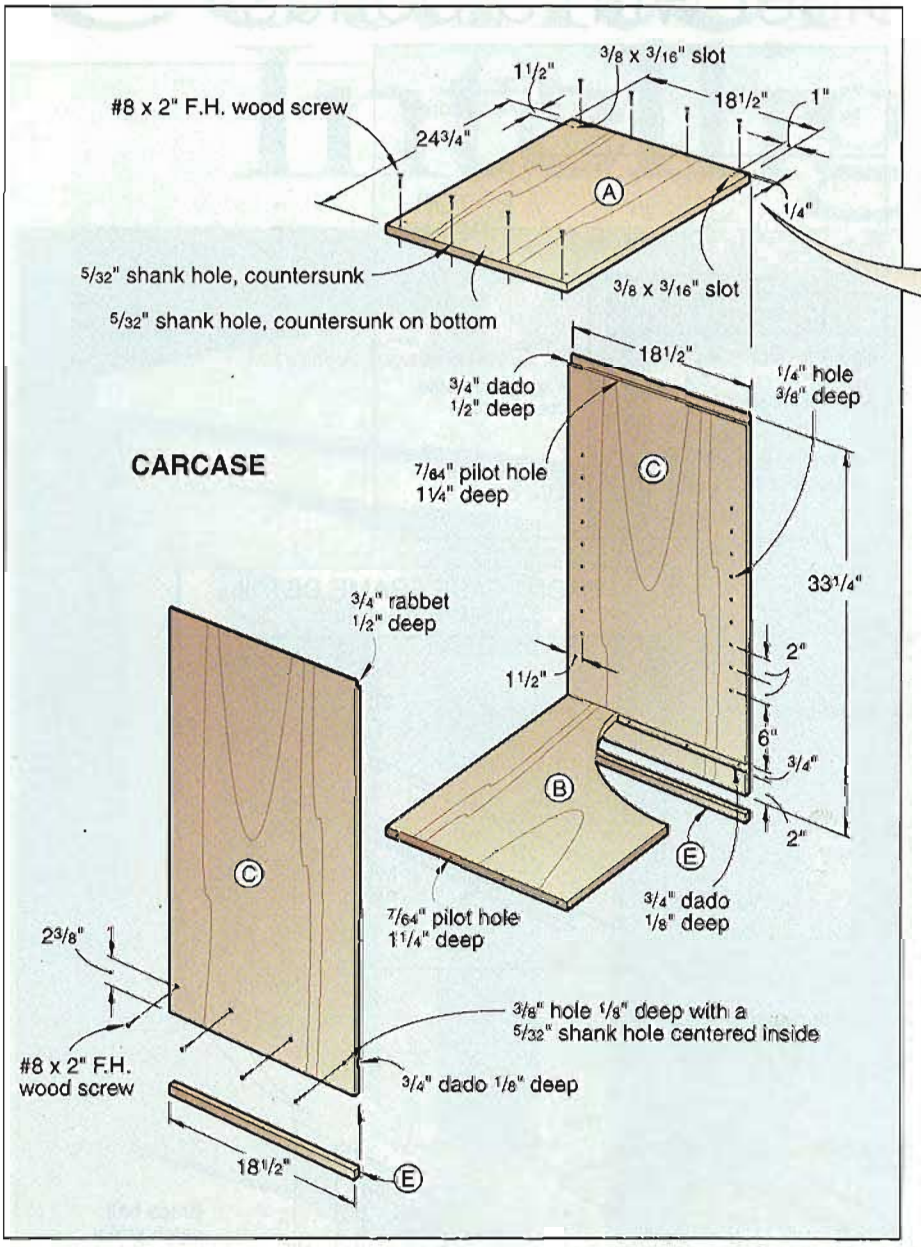
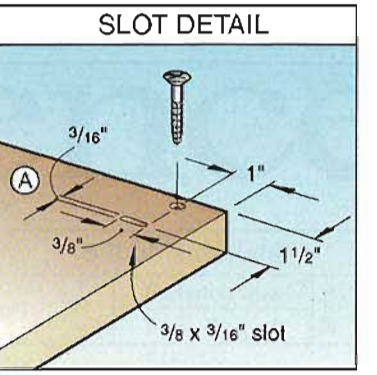




are shown in the Carcase drawing, the Top detail and Slot detail. Screws through the holes will locate the top while screws through the slots will let it swell or shrink with changing humidity.

5 Assemble and clamp the top (A), bottom (B), and sides (C). Refer to the Carcase drawing, then drill the countersunk screw holes through the top into the sides where shown. Drill the counterbored screw holes through the sides into the bottom where shown. Screw the carcase together.

Add the face frames next

1 Cut the face frame stiles (G), top rails (H), and bottom rails (I) to size. Sort the pieces into parts for two frames—one for the front and one for the back. Arrange them in assembly order and mark them.

On the parts for the back frame, mark the inside corner of each piece for rabbeting (see the Back Face Frame drawing).

2 Using your tablesaw with a ½" dado blade set to ½" cutting depth, saw the rabbets on the stiles and rails of the back face frame.

3 Without changing the tablesaw setting, saw laps at both ends of the stiles (G). For the back frame, saw the laps on the rabbeted face of the stiles. Saw those on the front frame's stiles on the inside face. Note that the laps are different lengths, depending on the location—refer to the Exploded View drawing, Front Face Frame detail, and Back Face Frame drawing.

4 Change the cutting depth to ¼", and saw the mating laps in the rails (H, I). Again, the lap lengths vary; check the appropriate drawings for the lap dimensions.

5 Glue and clamp the frames together. Measure the diagonals to ensure that the frames are square.

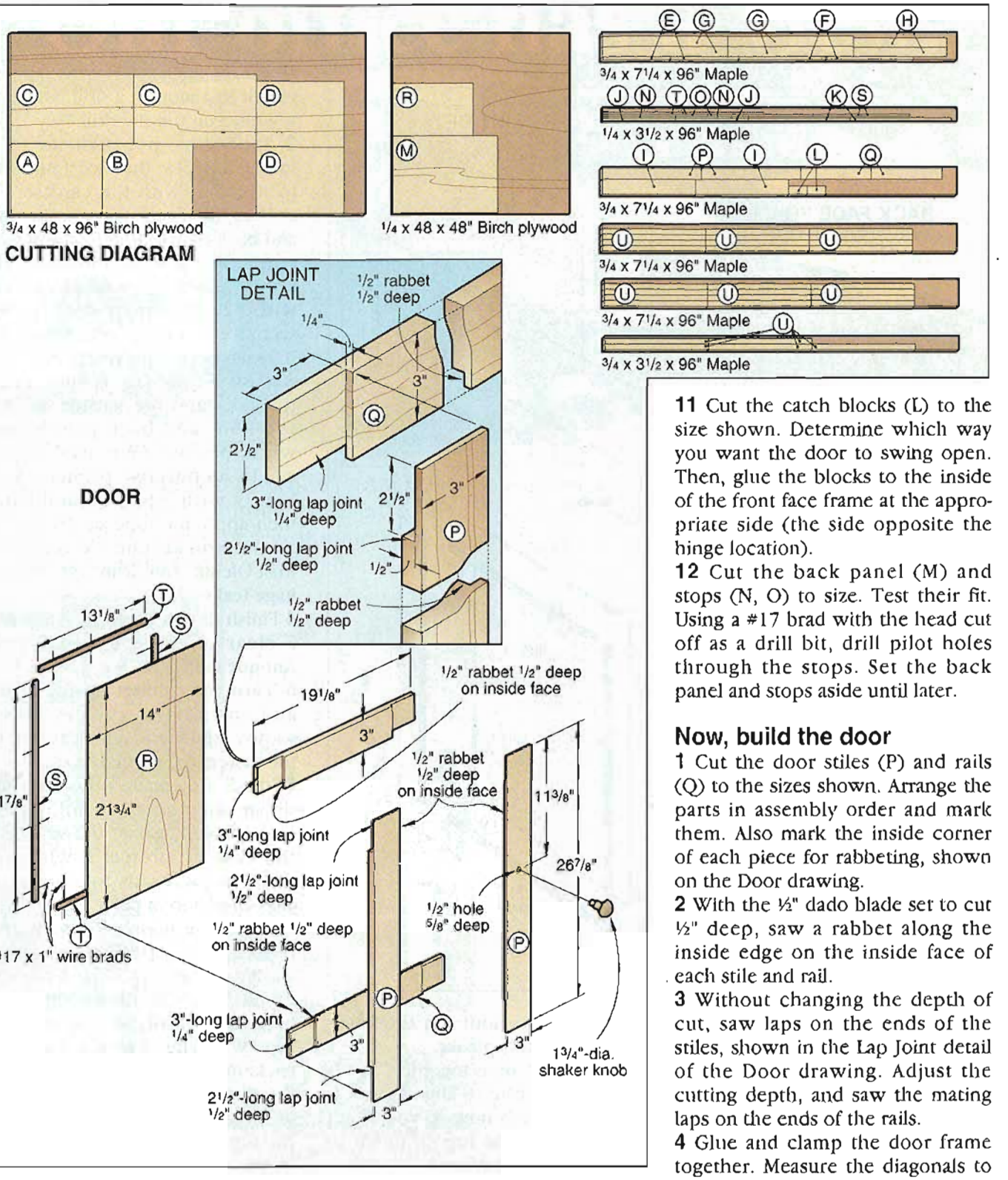
6 After the glue dries, unclamp. Then, sand a slight chamfer along the outside edge of the inside face of each frame. Sand a similar chamfer along the outside edge of the carcase sides where shown.

7 Glue and clamp the face frames to the carcase.

8 Cut stock for the beads (J, K) about 1" longer than specified. Using a ⅛" round-over bit chucked in a table-mounted router, round over both corners along one edge on each piece.

9 Sand a slight chamfer along the inside edges of the front face frame where the beads will be installed. Miter-cut the beads to length, and glue them in place.

10 Drill holes for the shelf supports in the sides (C), positioning them where shown in the Carcase drawing. To space the holes evenly and



accurately, make a drilling guide from a ¾×3×24" piece of scrap wood (plywood or particleboard would work).

To make the guide, draw a centerline running the length of the stock. Mark a center on the line 6" from the bottom, then mark eight more centers 2" apart. Drill a ¼" hole at each center mark.

To use the jig, place it inside the carcase against the side (C), push the edge against the face frame, then drill the holes in the side. Set a stop on your bit so you won't drill through the side.

11 Cut the catch blocks (L) to the size shown. Determine which way you want the door to swing open. Then, glue the blocks to the inside of the front face frame at the appropriate side (the side opposite the hinge location).

12 Cut the back panel (M) and stops (N, O) to size. Test their fit. Using a #17 brad with the head cut off as a drill bit, drill pilot holes through the stops. Set the back panel and stops aside until later.

Now, build the door

1 Cut the door stiles (P) and rails (Q) to the sizes shown. Arrange the parts in assembly order and mark them. Also mark the inside corner of each piece for rabbeting, shown on the Door drawing.

2 With the ½" dado blade set to cut ½" deep, saw a rabbet along the inside edge on the inside face of each stile and rail.

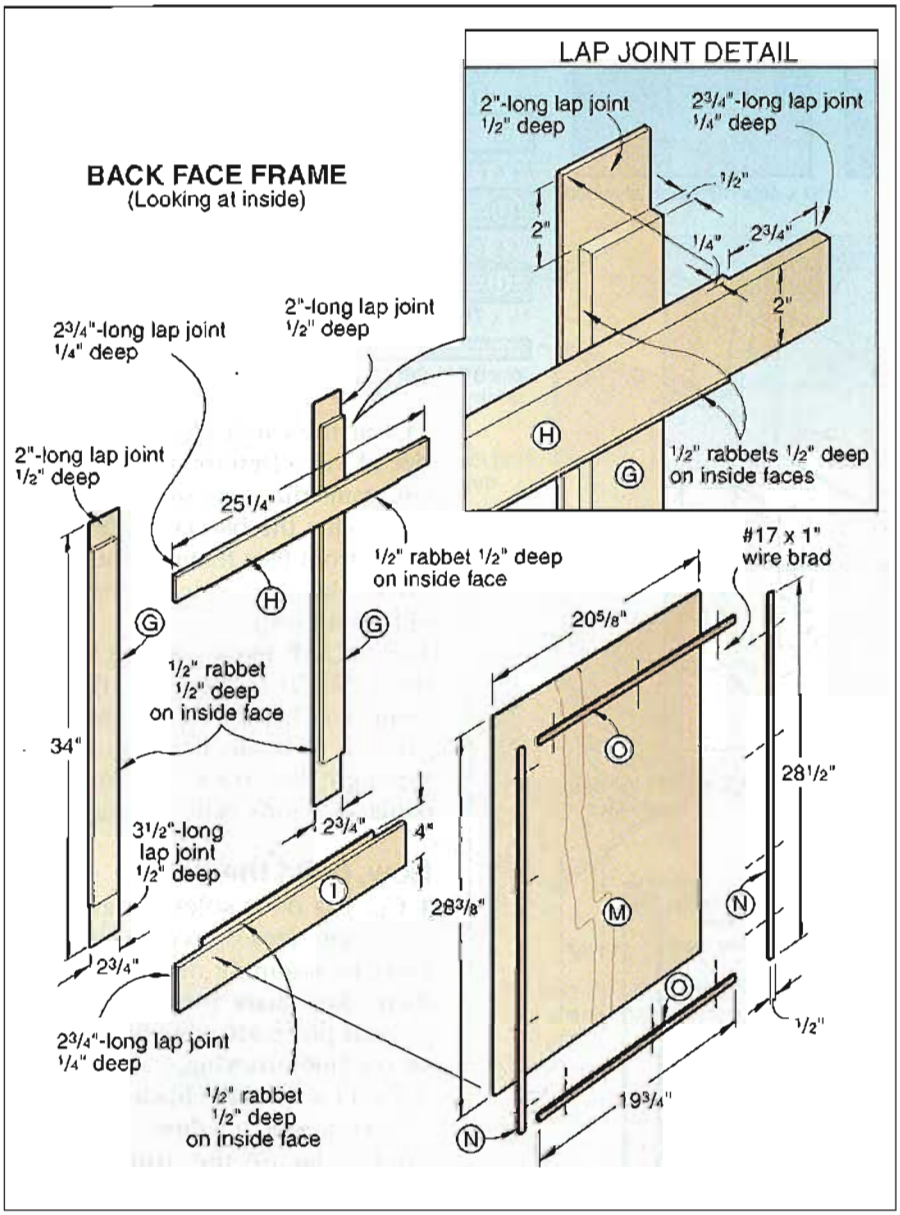
3 Without changing the depth of cut, saw laps on the ends of the stiles, shown in the Lap Joint detail of the Door drawing. Adjust the cutting depth, and saw the mating laps on the ends of the rails.

4 Glue and clamp the door frame together. Measure the diagonals to ensure that it's square.

5 Cut the door panel (R) and stops (S, T) to size. Test their fit. Again using a #17 brad, drill pilot holes through the stops. Set the panel and stops aside until later. Drill a hole for the door pull in the stile on the latch side of the door.

Continued

Counter Intelligence



Top your cabinet with a butcher block

1 Cut 29 maple pieces ¾×1⅝×28" for the laminated butcher block top (U). If your maple measures less than ¾" thick, cut enough pieces to achieve the 21¾" finished width.

2 Laminate the strips into sections narrower than your jointer's maximum cutting width. Turn the pieces on edge as you glue them, and make sure the thickness of each section remains at 1⅝".

3 After the glue dries, joint one face of each lamination smooth. Then, plane them to uniform thickness with a thickness planer.

4 Glue the sections together, two at a time. Take care to align both surfaces flush each time so you won't have to sand the top so much to make a smooth surface.

5 Cut the top to length. Round over the top corners with a ¼" roundover bit and handheld router.

OK, let's finish it up

1 Fill the counterbored holes in the sides. Sand flush, then finish-sand all parts. To finish-sand the knob, chuck its tenon in a drill, and sand it while you run the drill.

2 Apply gloss polyurethane to all inside surfaces, the face frames up to the joint with the carcase, the shelves, the inside faces of the door and back panels, the door and back stops, the door frame, and the knob. Allow to cure, then sand with 320-grit sandpaper. Apply a second coat to the same parts—this time using satin polyurethane.

3 Mask off the face frames. Prime the sides and the outside faces of the door and back panels with white primer. (We used Krylon #1315 all-purpose primer.) Sand lightly with 320-grit sandpaper, then apply the topcoat. (We painted our roll-around cabinet with Rust-Oleum American Accents heritage teal #7929.)

4 Finish the butcher block top with a clear oil. (We used Olympic Antique Oil Finish.)

5 Turn the cabinet upside down, and install the casters where shown. Allow enough clearance for the casters to swivel freely.

6 Install the panel in the door, and secure with the stops. Hold a piece of cardboard against the surface of the panel to protect it while you drive in the brads for the stops. Glue the knob in place.

7 Install the door with no-mortise hinges. The offset hinge knuckle should extend over the front face of the door, with the flat side of the hinge against the bead in the opening. Working through the open back, install the ball catches.

8 Center the butcher block on top of the cabinet. Drill pilot holes into the top through the holes and slots in the carcase top. When drilling through the slots, drill right in the middle. Fasten the top in place with screws and washers, as shown in the Top detail.

9 Install the back panel and stops. Then, position shelf supports where desired, and set the shelves in place.

Project Design: Jan Svec Photograph: John Hetherington Illustrations: Roxanne LeMoine; Lorna Johnson

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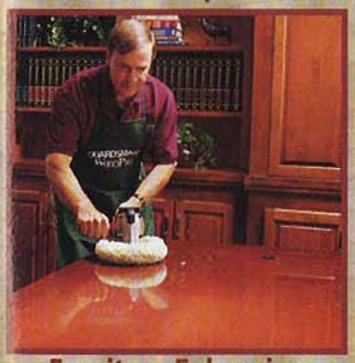

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NS150 18ga 1-1/2"finish stplr169
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360VS 3x24 vs belt sander 229
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9862 12v 3/8" dr kit w/2 bat 169
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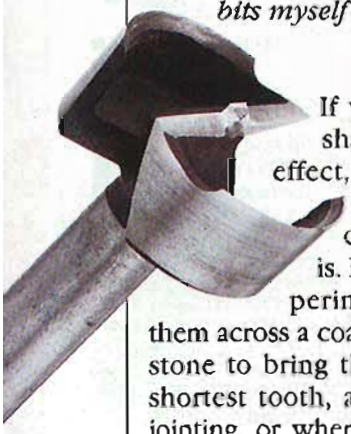
Keeping Forstner bits sharp

I have learned how to sharpen most of my tools except Forstner bits. Is it possible to sharpen these bits myself or should I hire a professional?

—William Weaver, Marquette, Mich.



If you can sharpen a chisel, you can sharpen a Forstner bit, which is, in effect, a series of chisels. The operation requires two or three steps, depending on how far gone the bit is. First, check the teeth around the bit's perimeter. If they differ in height, rub them across a coarse or medium natural or artificial oil stone to bring them all down to the height of the shortest tooth, a procedure called "jointing." After jointing, or when the tips of the teeth have rounded from wear, use a small triangular file to reestablish each tooth's angled point. Sharpen the edges of the cutters by locking the bit horizontally in a vise and passing a flat file along the front face of each cutter. Finally, file the tip of the spur to a sharp point.

Potential polyurethane problems

For years, I've put polyurethane over laquer or sanding sealers containing stearates. But recently, I've noticed that some polyurethane labels say not to use polyurethane over stearates, laquers, and shellac. So, I have two questions—what are stearates and why the warning on the label?

—Emerson Sander, Antioch, Ill.

To answer your questions in order: Zinc stearate, an additive in lacquer-base sanding sealers, is also known as mineral soap, and resembles the stuff you use in the shower. It acts as a lubricant that helps keep the sandpaper from clogging up. But polyurethane, which isn't terribly difficult to sand anyway, doesn't bond well to finishes that contain mineral soaps. Same goes for most shellacs, which contain wax. So you shouldn't use a sanding sealer or shellac that contains wax under polyurethane. Instead, seal the bare wood with poly, sand, and apply more poly.

Finding a place for persimmon

A friend of mine bought a piece of property with a lot of persimmon trees on it—old, good-sized trees. We had to remove quite a few of these trees and would like to have some of the logs milled. What can you tell us about this dense wood?

—Robert Lowe, Ocean City, Md.

You're right about the density, Bob. In fact, another name for persimmon is American ebony. This density makes persimmon difficult and expensive to mill and dry. Until recently, its primary use was as material for golf club heads. However, since most of the "woods" now manufactured for golfers are made of metal, even that unique place has fallen by the wayside.

Stiff brushes make me bristle

I have a problem cleaning brushes after applying Defthane. I use the finest brushes and get upset that I have to soak them in brush cleaner before using them. After applying the finish, I follow the directions for cleaning and wrap the brushes in brown paper to maintain the shape. But, every time, the brushes become stiff. What else can I do?

—John Lasch, Chicago, Ill.

We sympathize with you, John. Trying to work with a stiff brush is like trying to apply finish with a stick. Jan Svec, one of our project builders, stresses that you should be using a natural-bristle brush. Second, he does everything exactly the way you do except for one extra step. After washing the brush in mineral spirits, he thoroughly rubs in a hand cleaner such as Gojo, then moves to warm, soapy water to rinse out the hand cleaner and remaining finish residue.

Have a question for our woodworking experts?

No matter how simple or perplexing your woodworking problem, we would love to hear from you. We'll do our level best to solve your mystery, and you might even find your question and our reply on this page.

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Continued on page 88

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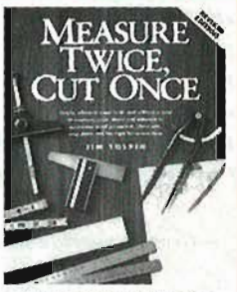

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30T 1/8" or 3/32"	$135	$ 99	$ 89	$ 79
9"X40T	$146	$109	$ 98	$ 87
30T	$125	$ 99	$ 89	$ 79
*8-1/4"X40TX 3/32"	$136	$ 99	$ 89	$ 79
8"X40T 3/32"	$136	$ 99	$ 89	$ 79
30T	$115	$ 89	$ 80	$ 71
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8"X60T	$150	$109
7-1/4"X60T	$150	$109

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8" x 80T x 1/8" & 3/32" K	$202	$169	12" x 100T x 1-1/8"K	$253	$215
220mm x 80T x 1/8" x 30mm	--	$159	14" x 80T x 1"	$232	$197
9" x 80T x 1/8" & 3/32" K	$207	$179	14" x 80T x 1"	$265	$226
10" x 80T x 1/8" & 3/32" K	$207	$159	16" x 100T x 1"	$262	$243
12" x 80T x 1-1/8"K	$212	$181	16" x 100T x 1"	$294	$243

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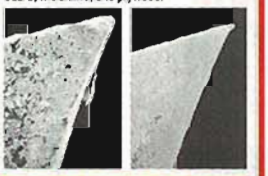

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Fine Woodworking Magazine test Oct. 96 page 43

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Rick Price

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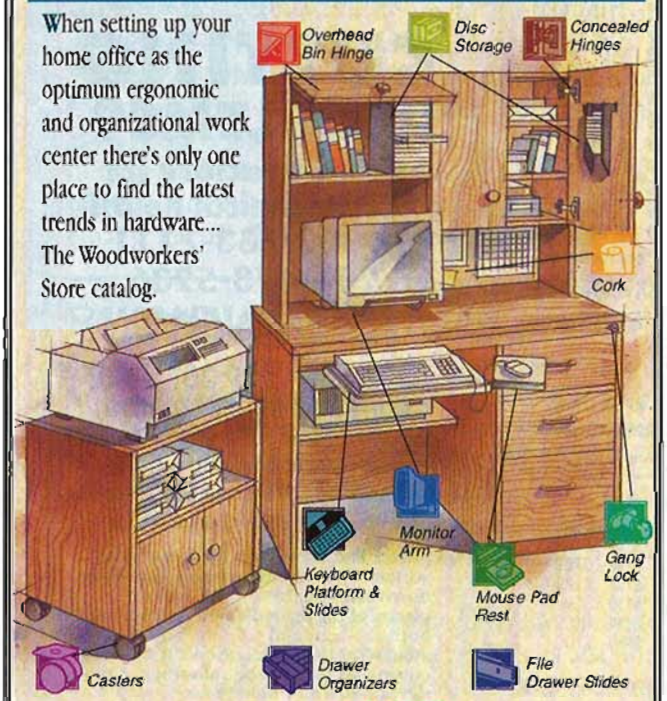

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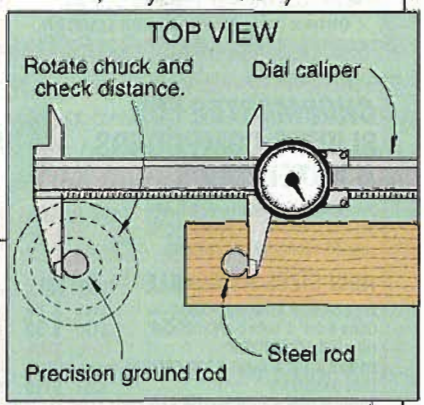
Continued from page 86

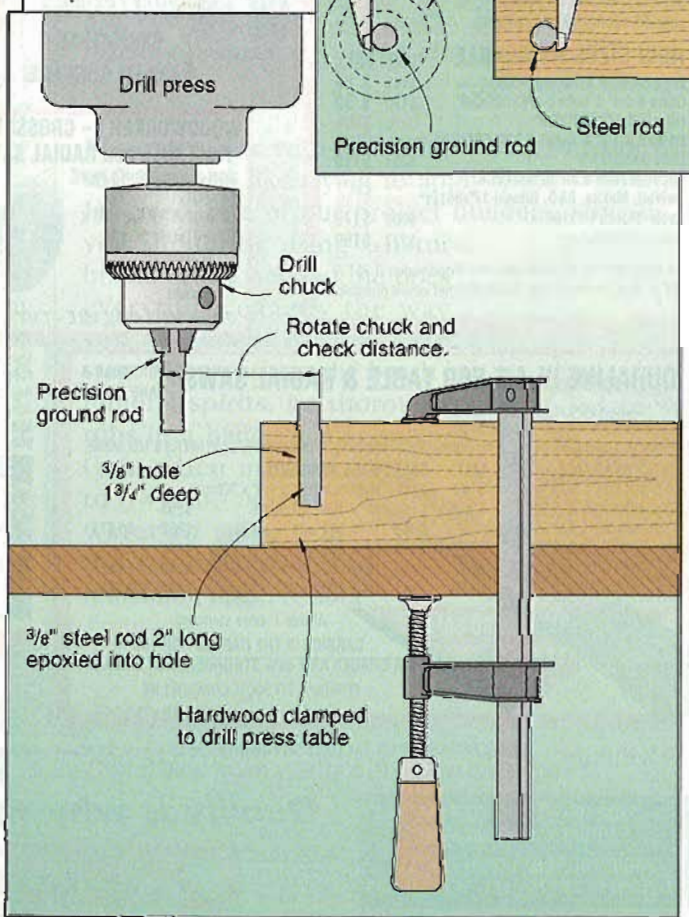
Measuring drill press accuracy

In your October 1996 issue, you suggested a reader monitor drill press run-out. I have a new benchtop drill press and decided to check the run-out with a dial indicator. It read .001" at the spindle where it exits the head, .003" at the bottom of the spindle with the chuck removed, and .007" on the smooth part of the shank of a new drill. That last reading seems a bit much, especially since it will be amplified at the tip of the bit. It seems to me the chuck is the culprit and should be returned to the store. Am I right?

—Greg Slingerland, Kitburn, Ont.

You're probably right, Greg, but it's also possible that even a brand-new bit is ever-so-slightly bent. Instead of a bit, we use a length of precision-ground rod to check run-out. Some dial indicators come with a piece of precision rod, or you can buy one at a machinist's supplier. Check run-out as shown *below* and *right*. If it exceeds the .003-.005" range, try another chuck.

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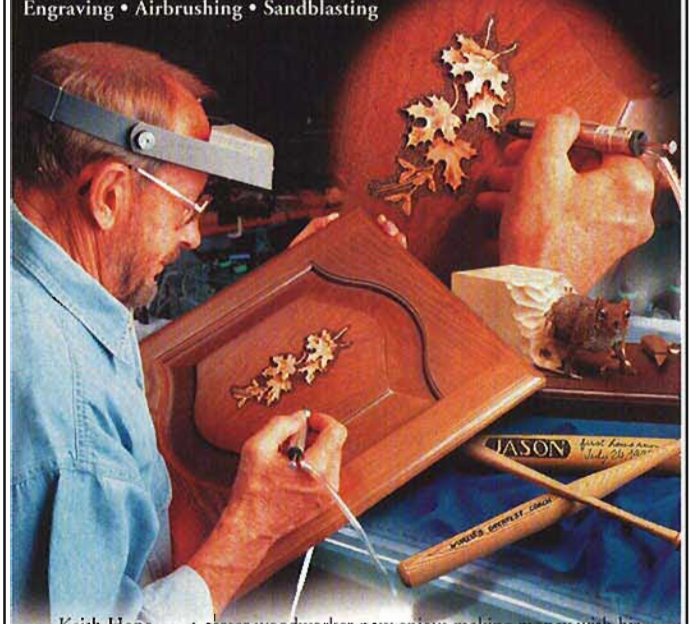
Precision ground rod
3/8" hole 1 3/4" deep
3/8" steel rod 2" long epoxied into hole
Hardwood clamped to drill press table

Continued on page 90

Having Fun Making Money. . .

A Dream Come True for anyone
who loves to work with their hands

Engraving • Airbrushing • Sandblasting



Keith Hone . . . a career woodworker now enjoys making money with his Paragraphic Engraving System. Using simple patterns that he just traces and our new ultra-high speed drill (amazing 300,000 r.p.m.) It allows even a non-artist to produce professional results fast and easy.
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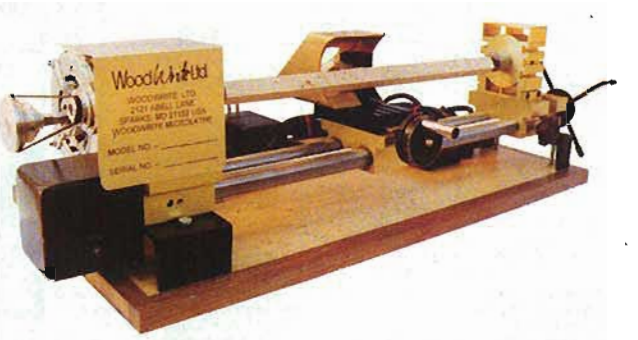

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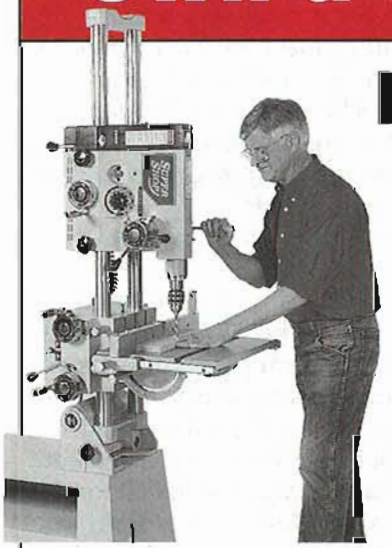

It's 10 tools in 1!

Do the work of 10 tools with 1 compact, affordable machine

- Work on wood, metal, or plastic
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- Built to last a lifetime

The perfect friend to relax with, the perfect partner to help get work done

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34" Lathe		Lathe
10"/12" Table saw	Router	Mill
12" Disc sander	Shaper	Drill
Horizontal boring		
Drill press		

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—Edward Zych (TN)

PLUS! Each machine includes:
Premium Tool Pak • Toll-free Helpline
2-year Warranty

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Cypress	4/4	Select	2.20		$ 70.00
White Pine	4/4	F.G.	1.10		$ 51.00
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Above prices are for 100' quantities of kilndried rough lumber sold by the Bd. Ft. FOB Mayodan, NC. Call for quantity discounts. Other sizes and grades available.

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Custom Raised Panel Doors and 1 Piece MDF Now Available.

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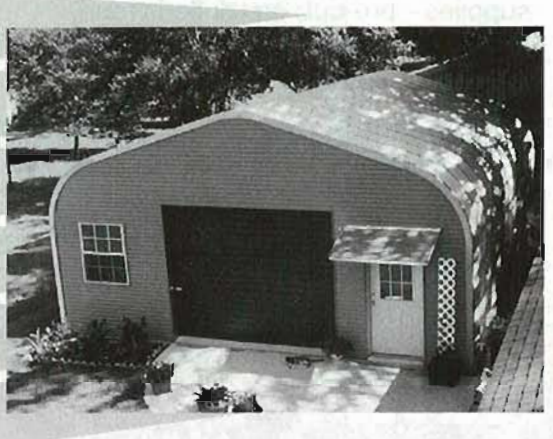

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Circle No. 2030

ASK WOOD

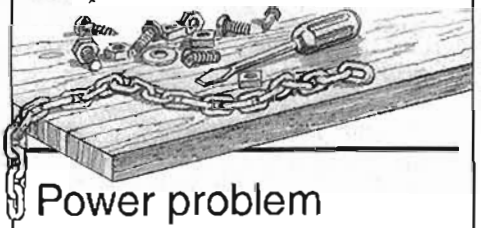
Continued from page 88

Adding stress to your project

I would like to add an antique look to some of my projects by having a few marks or dents on the piece. I hear of people who use a chain to add this look. How would you suggest I mark it and how do I finish it?

—Les Hill, Sun City, Ariz.

Whupping your projects with a chain is just one way to instantly age them, Les. You can also poke "worm holes" with an ice pick or awl, bang surfaces with a cloth bag of nuts and bolts, gouge them with a screwdriver, and round edges with sandpaper. The real trick of distressing is knowing when to stop—what you want to create is the subtle look of age, not a battered look. Distressing is particularly effective under an antiqued finish.



Power problem

I just got a new tablesaw for my new shop, but whenever I turn on the saw, the lights dim in my shop (and other parts of the house). Short of calling in an electrician, is there anything I can do to remedy the problem?

John Waclawski, Akron, Ohio

Sorry, John, but you're going to have to make that call. Your brownout is caused by the electrical surge that occurs when you power up any big motor, and the only solution is to have a separate "dedicated" circuit installed for the saw. And while you're at it, you might have the electrician run another new circuit or two to your shop. That way you can count on having plenty of juice for your other power tools (and any you might acquire down the road).

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8" JOINTER

- 2 H.P. MOTOR 220 VOLT
- 3 KNIFE JACKSCREW CUTTERHEAD
- 8" X 65" BED LENGTH
- CENTER MOUNT FENCE

S3107N

$785.00

NEW

(SHOWN WITH OPTIONAL MOBILE BASE)

AMERICAN WOODWORKER BEST BUY 1997

1-1/2 H.P. SHAPER

- 1-1/2 HP SHAPER
- 1/2" & 3/4" SPINDLES
- 2 SPEEDS

S3302

$420.00

3 H.P. SHAPER

- 1/2" & 3/4" & 1" SPINDLES
- 2 SPEEDS/ REVERSIBLE

S3303

$740.00

OSCILLATING SPINDLE SANDER

- 1 H.P. 110/ 220 VOLT
- 1725 RPM
- 24" X 24" TABLE TILTS 45°

S3407

$465.00

12" 5 HP CABINET SAW

S3206

NEW

SPECIAL INTRODUCTORY OFFER INCLUDES:

- TABLE SAW WITH 36" RIP
- STAR LOCK FENCE WITH MICRO ADJUSTER
- MOTOR COVER
- BUILT IN 4" DUST PORT

SPECIAL INTRODUCTORY PRICE

$1,475.00

(SHOWN WITH OPTIONAL MOBILE BASE)

10" CABINET SAW 3 H.P.

- MOTOR COVER
- MICRO ADJUSTER
- FREUD LU82 10"
- 36" RIP CAPACITY
- BUILT-IN 4" DUST PORT
- 220V MAGNETIC CONTROLS
- HEAVY DUTY TRUNNIONS

S3202

SPECIAL PRICE

$995.00

AVAILABLE AT THE SAME PRICE 5 H.P. 3 PHASE

20" BANDSAW

- 3 H.P. 220 VOLT
- 12" RESAW CAPACITY
- ROLLER GUIDES

S3506

$1,195.00

16" BANDSAW

- 2 H.P. 110/220 VOLT
- DUST PORT
- FOOT BRAKE
- 9" RESAW CAPACITY
- CAST IRON WHEELS

NEW

S3502N

$650.00

15" BANDSAW

- 1 H.P. 110 VOLT
- DUST PORT
- FOOT BRAKE
- 9" RESAW CAPACITY
- CAST IRON WHEELS

NEW

S3501N

$450.00

25" DUAL DRUM SANDER

- 5 H.P. 220 VOLT
- 2 SPEEDS 11 & 17 FPM/ REVERSIBLE
- CAST IRON WORK TABLE

S3409

$1,295.00

15" 3 H.P. PLANER

- 3 H.P. 220 VOLT
- 3 KNIFE CUTTERHEAD
- ADJUSTABLE BED ROLLERS

S3715

$875.00

(SHOWN WITH OPTIONAL MOBILE BASE)

2 H.P. DUST COLLECTOR

- 220 VOLTS
- 1182 CFM
- FREE 10" CLEAR HOSE

S3820

$250.00

HOLIDAY SPECIAL

8" JOINTER

- 1-1/2 H.P. 220 VOLT
- 3 KNIFE CUTTERHEAD
- 8" X 65" BED LENGTH

S3102

$600.00

6" JOINTER

- 1 H.P. 110/220 VOLT
- 3 KNIFE CUTTERHEAD
- 47" BED LENGTH

S3101KD

$300.00

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LIMITED QUANTITIES

10" COMPOUND MITER SAW

2-1/2 HP, 15 amp motor. D-handle with trigger switch for positive control. Electric brake automatically stops blade in seconds. Includes dust collection bag, 10" blade with 5/8" arbor, and retractable blade guard.

- Blade speed: 4900 RPM @ no-load
- Capacities: 2-3/4" x 5-3/4" crosscut; 2-3/4" x 4-1/8" 45° right & left miter; 1-3/4" x 5-3/4" 45° left bevel; 1-3/4" x 4-1/8" 45° x 45° compound
- Table diameter: 10-1/2" • Tool wt.: 60 lbs.
- Factory reconditioned, factory perfect

ITEM 06125-3KMA **$155.99**

CENTRAL MACHINERY

LIMITED QUANTITIES

10" PLANER

- 2 HP, 110V, 1 phase, 11 amp, 8000 RPM
- 5-1/8" working distance
- 10-1/8" x 9-1/8" feed table
- 19" x 16-5/8" x 16" overall dimensions
- 10-1/8" blade size
- 2-blade cutter head
- 61 lbs. shipping weight
- Stand sold separately

ITEM 06935-1KMA **$239.99**

PLANER STAND (NOT SHOWN)

- 20" x 10" x 27"
- Shipping weight: 20 lbs.

ITEM 32969-3KMA **$29.99**

ALL NATURAL BRISTLES

INDUSTRIAL GRADE CHIP BRUSHES

Ideal all-around brushes. Used in a variety of manufacturing processes. Rugged construction includes all natural bristles and sturdy hardwood handles. Sold by the case.

SIZE	QTY.	ITEM	PRICE
1"	36	04181-3KMA	$5.99
2"	36	04182-6KMA	$10.99
3"	12	04183-0KMA	$6.99
4"	12	04184-1KMA	$11.99

LASER LEVELER

Compact high output leveler projects a round dot visible up to 600 feet away. Solid brass construction. Also includes a professional quality built-in spirit (bubble) level. Locking on/off switch.

- 4-1/4" long x 3/4" diameter

~~$59.99~~ **$49.99**

ITEM 36535-2KMA

CHICAGO Electric Power Tools INDUSTRIAL

3/8", 16.8 VOLT CORDLESS DRILL KIT WITH KEYLESS CHUCK

- Variable speed, reversible; 0 to 900 RPM
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, charger, battery, *Jacobs*® keyless chuck, and case
- Maximum torque: 200 in. lbs.
- 6 torque settings

~~$69.99~~ **$59.99**

ITEM 36387-3KMA

16.8V REPLACEMENT BATTERY

ITEM 36390-1KMA **$29.99**

15 MOST POPULAR SIZES!

TUNGSTEN CARBIDE TIPPED ROUTER BIT SETS

Both include individually organized storage cases. 15 most popular sizes. • 1/4" shanks

15 PC. ASSORTED BITS

Includes: 1-1/4" rabbeting♦, 1-3/8" cove♦, 1-1/16" roman ogee♦, 1-1/4" rounding over♦, 1/2" flush trimming♦, 1-3/16" 45° chamfer♦, 1/2" dovetail, 3/4" straight, 1/2" straight, 3/8" V-groove, 1/4" combination panel, 1/4" straight, 1/2" mortising, 1/4" cove, 1/8" straight
♦Includes pilot bearing **$39.99**

ITEM 31164-9KMA

4 PC. ROUNDING OVER BITS

- Sizes: 1/8", 1/4", 3/8", & 1/2"
- Set includes 4 rounding over bits w/pilot bearing tips
- 2 flutes each
- 1-5/32" long shanks **$19.99**

ITEM 33078-5KMA

RYOBI

LIMITED QUANTITIES

Ryobi OSS450

OSCILLATING SPINDLE SANDER

Nothing beats this machine for contour and curve sanding. 1/2" to 3" drum size range (includes 1/2" and 1" drums) gives you the options you need. Removes stock fast using the whole drum and prevents sanding burn marks.

- 120V, 3.5 amps • 1680 RPM
- 45 oscillations per minute
- Dust collection port
- 29 lbs. tool weight
- Factory reconditioned, factory perfect

ITEM 33625-6KMA **$119.99**

CENTRAL MACHINERY

4" x 36" BELT/ 6" DISC SANDER

Adjustable belt sands inside and outside curves. Cast aluminum sanding disc features a cast aluminum table that locks in any angle from 0° to 45°. Table can be repositioned for use with belt or disc.

Includes: 7-1/2" x 5" cast aluminum table, miter gauge, and adjustable backstop; 4000 FPM belt speed; 1725 RPM disc speed; 1/3 HP, 1725 RPM, 115V, single phase

LIMITED QUANTITIES

ITEM 05154-6KMA **$59.99**

SANDING BELT CLEANER

- Increase the life of your sanding belts and discs up to 500%
- 8-1/2" x 1-1/2" x 1-1/2"

ITEM 30766-1KMA **$4.99**

HOLE SAW SET

Cut smooth, clean, accurate holes through wood, drywall, or even plaster up to 1" thick! Ideal for plumbers and electricians.

11 PC. HOLE SAW KIT

Includes 8 tool steel cups sized 3/4", 7/8", 1", 1-1/4", 1-1/2", 1-3/4", 2", and 2-1/2", plus 1/4" and 3/8" mandrels, a 1/4" bit, a hex wrench, & a blow mold case.

~~$14.99~~ **$7.99**

ITEM 01263-1KMA

10 PC. LARGE HOLE SAW KIT

Includes cutting cup sizes 2-1/2", 3", 3-1/2", 4", and 5", plus 3/8" mandrell, drive plate, hex wrench, & blow mold case.

~~$12.99~~ **$8.99**

ITEM 36222-2KMA

CENTRAL MACHINERY

10", 2 HP, BENCH TABLE SAW

Die cast aluminum table 25-3/4" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting. Blade adjustments control angle and depth of cut.

- Maximum depth of cut at 90°: 3-1/8"; at 45°: 2-1/2" • Shipping weight: 36 lbs.
- Miter gauge adjusts 0° - 60° left and right
- Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM • Blade capacity: 10" with 5/8" arbor
- Blade sold separately, below

ITEM 35715-3KMA **$89.99**

10" 40 TOOTH CARBIDE TIP SAW BLADE

- 5/8" arbor

ITEM 00529-4KMA **$9.99**

NEW!

7-1/4" ADJUSTABLE DADO BLADES

Carbide steel tips last up to 50 times longer and can be resharpened. High speed steel blades are denser and stronger for greater impact resistance. Does not have to be removed from saw to adjust cutting width.

- 4500 max. RPM
- 1" arbor with 5/8" adapter

TEETH	ITEM	PRICE
CARBIDE DADO BLADES		
24	36911-1KMA	$19.99
40	36912-0KMA	$29.99
HIGH SPEED STEEL DADO BLADES		
24	36913-0KMA	$14.99
40	36914-0KMA	$19.99

PORTER-CABLE®
Porter Cable 347K

LIMITED QUANTITIES

7-1/4" FRAMER'S SAW

The lightest professional circular saw on the market! Die-cast magnesium construction. Built-in dust nozzle and 100% ball and needle bearings.

- 120VAC, 25-60 Hz, 15 amps
- 5800 RPM no load speed
- 5/8" arbor • Tool weight: 10-1/4 lbs.
- Factory reconditioned, factory perfect

BLADE ON THE RIGHT

ITEM 51599-2KMA **$99.99**

BLADE ON THE LEFT
Porter Cable 743K

ITEM 51601-2KMA **$99.99**

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CHICAGO Electric Power Tools

VARIABLE SPEED
RECIPROCATING SAW

- Gear driven, variable speed • 3.6 amps
- 300 SPM to 2400 SPM • 1-1/4" stroke
- All ball bearing • Overall length: 17"
- 110V, 60 Hz, single phase • 600 Watts
- Tool weight: 7-1/4 lbs.

ITEM 36595-2KMA ~~$69.99~~ $59.99

BI-METAL SAWZALL® BLADES 5 PACK

- 18 teeth per inch, 6" length
- 1/2" universal shank

Milwaukee 48-01-1184
ITEM 03323-4KMA $9.99

RECIPROCATING SAW BLADES

- 5 metal cutting 18 TPI, 5 wood cutting 8 TPI
- 1/2" universal shank

ITEM 06467-0KMA 10 PACK $5.99

CENTRAL MACHINERY

BENCH TOP SHAPER/ ROUTER

Expand your workspace with this handy wood shaper. Big machine features and compact enough to store under your bench. Very advanced – accepts both shaper cutters and router bits for the exact finish you want.

- Rear chip discharge
- Individually adjustable fence halves
- Cast iron work table and base
- Uses 2" diameter shaper cutters and router bits with 1/4" shank
- 10,200 RPM motor speed
- 115V, 4.3 amps, 7/8 HP

~~$109.99~~ $89.99
ITEM 32650-0KMA

CENTRAL MACHINERY

16" SCROLL SAW

- Precision milled 14-1/2" x 8" table tilts 0° to 45° • 1/8 HP, 110V, .83 amps
- Uses pin end blades, 5-1/2" long
- Heavy duty cast iron frame and base reduce vibration • 7/8" blade stroke
- 1750 SPM blade speed

ITEM 36392-1KMA $59.99

5 PC. 5-1/2" SAW BLADES

- Pin end type

ITEM 35024-0KMA $4.99

PORTABLE MITER SAW TABLE

This is the answer to transporting cutting power anywhere on the job site. Your miter saw mounts directly to the table. Folds down for easy storage and wheels add extra mobility.

- 39" x 59-1/2" x 15" overall dimensions
- 11-1/2" x 50" bed

(Saw and wood shown sold separately.)

~~$49.99~~ $39.99
ITEM 32047-5KMA

CENTRAL MACHINERY

8"
BENCH GRINDER

Rugged capacitor start motor, builds up to speed instantly, and provides plenty of power to avoid stalling. Steel sealed ball bearings support the motor shaft for exceptionally long wear. Comes equipped with 2 grinding wheels, large adjustable eye shields, adjustable tool rests and conductor cords with 3-prong plugs.

- 39 pounds shipping weight
- 1/2 HP motor; 3450 RPM
- 5/8" arbor

~~$59.99~~ $49.99
ITEM 34948-4KMA

CENTRAL MACHINERY

NO MORE LOST CHUCK KEYS!

5 SPEED BENCH
DRILL PRESS W/KEYLESS CHUCK

1/2" chuck capaity, and a 1/3 HP motor turning 1720 RPM.

- Five speeds: 620, 1100, 1720, 2340 and 3100 RPM • 22-1/2" high
- 2" stroke, 8-1/4" swing
- Column diameter: 1-13/16"
- Table dimensions: 6-1/2" x 6-5/8"; tilts 45° left and right
- Base dimensions: 7-3/16" x 5-5/8"
- 49 lbs. shipping wt.

~~$69.99~~ $49.99
ITEM 34231-6KMA

DRILL PRESS W/ KEYED CHUCK

~~$59.99~~ $48.99
ITEM 05901-0KMA

IRON HORSE

SAVES TIME & MAN-POWER

Iron Horse TAWS1
ADJUSTABLE HEIGHT WORK SUPPORT

Heavy duty steel base supports rugged plastic rollers. Use with table saws, miter saws, router tables, radial arm saws and many other power tools. Height adjusts from 25" to 43" for maximum versatility. A must for any shop.

ITEM 02379-5KMA ~~$19.99~~ $16.99

FOLDING WORK SUPPORT

This heavy duty support folds for travel and storage. • Adjusts from 28" to 46" high
• 21"W x 19"D base • 6 lbs.

Iron Horse TAWS2
~~$33.99~~ $25.99
ITEM 05252-4KMA

CHICAGO Electric Power Tools

3-1/4" PLANER

- Front base has a V-groove to help guide in chamfering • 2 blade cutter
- Depth adjustment knob
- Includes rabbeling guide plate/fence, sharpening holder, blade setting jig, replacement brushes, and replacement belt • 34,000 cuts per minute
- D-handle with lock-on button
- 110V, 5 amps, 17,000 RPM
- 1/10" maximum depth of cut; 3-1/4" planing width
- 6-1/4 lbs. tool wt.

~~$53.99~~ $39.99
ITEM 32222-3KMA

2 PC. REPLACEMENT BLADES

ITEM 33262-0KMA $9.99

CENTRAL MACHINERY

DRILL 1/4", 3/8", & 1/2" SQUARE HOLES

MORTISING MACHINE

Make a square hole in the fraction of the time it takes by hand! Easier layout for professional mortise and tenon joints in furniture, cabinets, and restoration. Fence with hold down clamp keep workpieces from lifting off the table. Large capacity – up to 5" maximum height. Includes fence, workpiece clamp, and 1/4", 3/8", and 1/2" mortising chisels and bits.

- 10-7/8" x 7-3/4" base • 13-3/8" x 6" table
- 1/2 HP, 110V, 2.3 amps
- 3580 spindle speed • 60 lbs. ship. wt.
- 5" max. workpiece height • 5" throat
- Accepts .745" chisel shanks

~~$199.99~~ $159.99
ITEM 35570-4KMA

Diamond Life

1/2 OFF!

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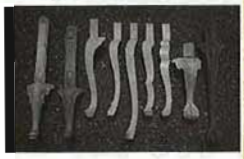

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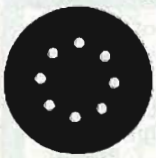

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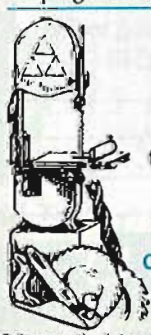

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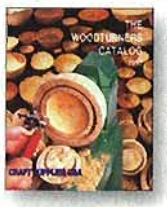

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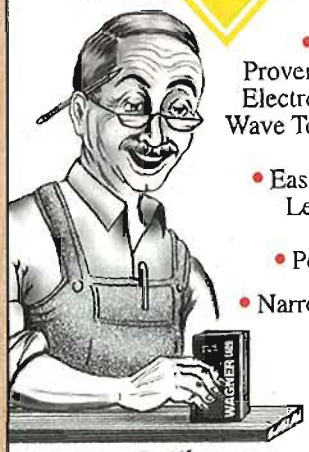

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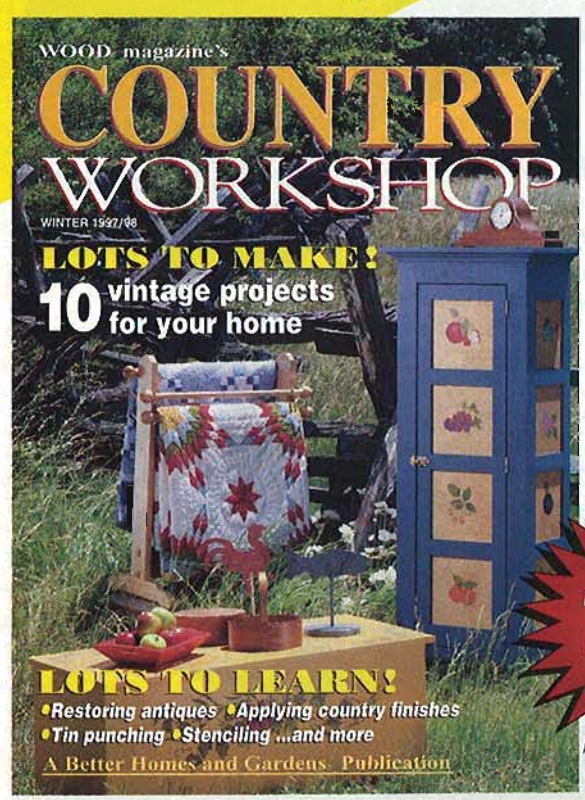

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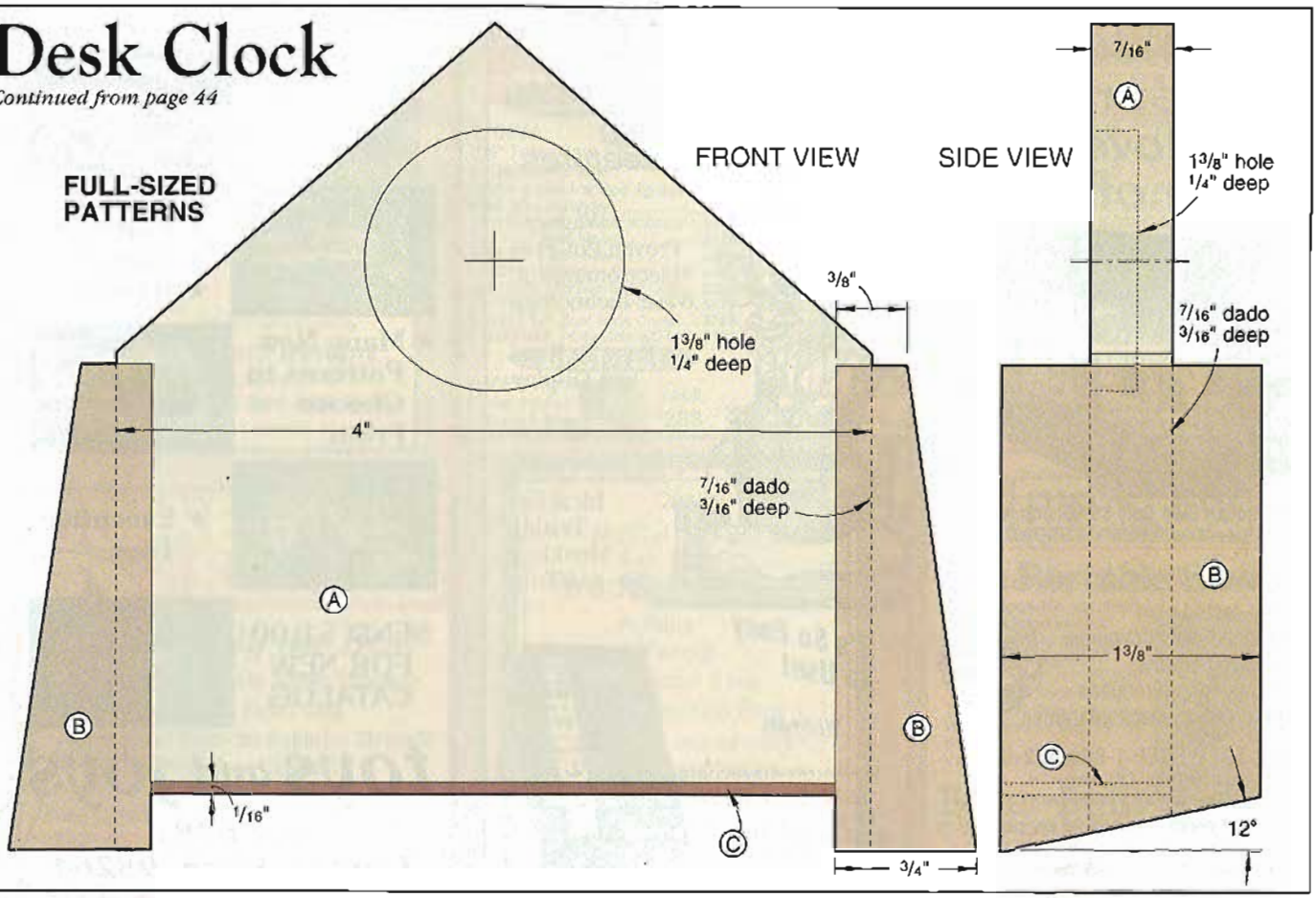

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6233DWAE	14.4V CORDLS KIT W/2 BATTERIES	194
BO5001	5" RANDOM ORBIT SANDER	67
DA391DW	9.6V ANGLE DRILL KIT	178
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LS1013	10" DUAL COMPOUND MITER SAW	566
LS1211	12" COMPOUND MITER	778
N1900B	3 1/4" PLANER	138

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31-080	1" BELT/5" DISC SANDER	88
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33-990	10" RADIAL ARM SAW	809
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40-540	16" VS SCROLL SAW	188
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DW359K	7 1/4" CIRCULAR SAW W/CASE	128
DW411	1/4 SHEET SANDER	57
DW420	5" RANDOM ORBIT SANDER, PSA	68
DW421	5" DSTLS RNDM ORB SANDER, VELCRO	69
DW423	5" VS DUSTLS RANDOM ORBIT SANDER	93
DW431	3" X 21" DSTLS BELT SANDER VAR SP	183
DW443	6" ROS SANDER VAR SP, VELCRO	139
DW610	1 1/2 HP ROUTER, 9 AMP	147
DW615	1 1/4 HP PLUNGE ROUTER, VAR SP	162
DW621	2 HP VS DSTLS PLUNGE ROUTER	214
DW625	3 HP HVY DTY PLUNGE RTR, VAR SP	268
DW673K	7/8 HP LAMINATE TRIMMER KIT	185
DW675K	PLANER KIT, 7.2 AMP W/STEEL CASE	159
DW682K	BISCUIT JOINER KIT	192
DW705	12" MITER SAW W/CARB BLADE	357
DW708	*NEW* SLIDING COMP. MITER SAW	667
DW733	*NEW* 12 1/2" PORTABLE PLANER	446
DW744	10" PORTABLE TABLE SAW	539
DW788	*NEW* 20" VAR. SPEED SCROLLSAW	479
DW935K	14.4V CDLS CIRCULAR SAW KIT	228
DW936K	18V CORDLESS CIRCULAR SAW KIT	244
DW972K2	12V CRDLS KIT/W BATTERY & CS	178
DW991K2	DW991K WITH TWO BATTERIES	208
DW991KS2	14.4V CDLS DRILL & CIRC SAW KIT	338
DW995K	18V 1/2" DRILL W/BATT, CHRGR & CS	224
DW995KS2	18V DRILL & SAW COMBO KIT	358
DW997K	18V HAMMER DRILL KIT, 1/2" CHUCK	244

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TR215	8 1/2" COMPOUND SAW	238
JS100	BISCUIT JOINER	94
JS102	BISCUIT JOINER W/VAR. ANGLE FENCE	118
FT2000E	3 hp PLUNGE ROUTER W/$30 REBATE	204
EB100	EDGE BANDING SYSTEM	214
F410	10" X 40T QUIET BLADE	48
F810	10" X 80T QUIET BLADE	73
LM72M010	10" X 24T FLAT TOP RIP BLADE	36
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TK806	10" X 80T THIN KERF CROSSCUT	47
TK906	10" X 50T THIN KERF COMBO	34

Circle No. 49

Bosch packs random-orbit palm-grips with power

When I tested random-orbit sanders a couple of years ago, Bosch had three top-rated side-handle models, but no entries in the palm-grip category. Now, Bosch has two powerful palm-grip models that perform on a par with their bigger brothers.

The two-speed Bosch 1295DH and the single-speed 1295D draw 2.4 and 2.2 amps respectively, making them the most powerful in their class. Both sanders tested use 5" hook-and-loop discs, although Bosch also offers pressure sensitive adhesive (PSA) versions.

PRODUCT SCORECARD

Bosch 1295DH and 1295D random-orbit palm-grip sanders

Performance	★ ★ ★ ★ ★
Price	about $90 and $80 reepectively
Value	★ ★ ★ ★ ★

S-B Power Tools, 4300 W. Peterson Ave., Chicago, IL 60646. Call 800/815-8665.

In high-speed (14,000 orbits per minute) mode, the 1295DH did a great job of quickly removing the machine marks from a glued-up ash tabletop panel. In low speed (12,000 orbits per minute), it gave me excellent control with moderate stock removal as did the one-speed model.

The 1295DH's rubberized grip comfortably fits your palm and Bosch puts the two-speed rocker switch conveniently at your fingertips. While the 1295D has a hard plastic grip, the hourglass body design on both sanders lets you grip them around the middle for extra control. Gripped either way, vibration is very low.

Both sanders emit little dust with the on-board molded plastic collection canister. By connecting them to a shop vacuum you can virtually eliminate dust emissions.

— Tested by Dave Henderson

1998 WOOD MAGAZINE EDITORS' CHOICE

Continued on page 109

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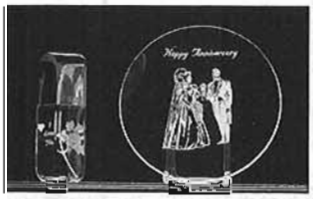

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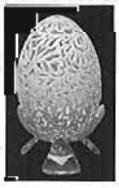

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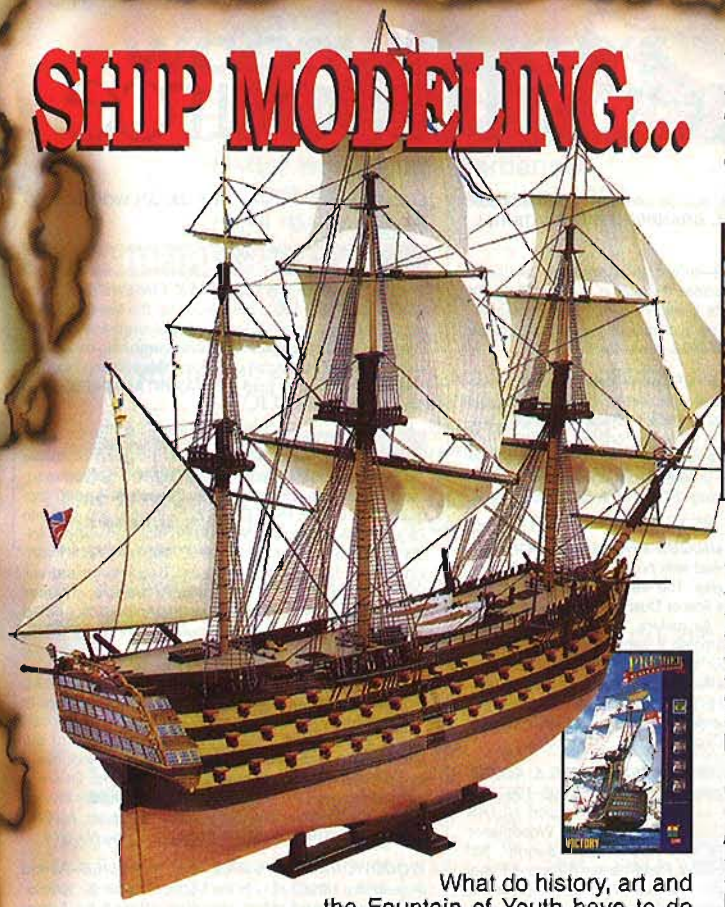

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556	16" Dovetail Jig	276
557	Biscuit Joiner	131
693	1.5hp Plunge Router	179
6931	Plunge Base	79
697	Router Table &motor	227
698	Router Table only	133
7334	4" RO Sander	109
7518	5 speed 3hp Router	273
7519	3 hp Router	254
7537	2 hp D-Handle Rtr	224
7538	3 hp Plunge Router	269
7810	Vacuum	257
9118	Door Planer Kit	234
9345	Sawboss w/ case	136
9444	Profile Sander	95
9444VS	VS Profile Sander	109
97310	Trimmer Kit	187
97355	5" RO Sander	144
97366	6" RO Sander	148

NEW NAILGUNS!!!

BN125 1 1/4" Brad Nailer $86

BN200	2" Brad Nailer	133
FN250A	2 1/2" 16g Finish	189
DA250A	2 1/2" angle Finish	245
NS150	1/4" crown Stapler	156
FR350	Framing Nailer	299
CF1540	1-1/2 hp Compressor	293

NEW CORDLESS!!!

9662	12V T-style Drill Kit	173
9662F	12V Kit w/flashlight	188
9663	12V Push handle Kit	184
9663F	Kit w/flashlight	194
9672	14V Drill Kit	188

Vari-Grip

Clamp 'n Tool Guide		Back-to-Back Bench Clamp	
50C	$ 29.50	BB50	$ 45.95
36C	26.50	BB36	37.95
24C	22.50	BB18	31.95

Panasonic

EY6100EQKW NEW! PREDATOR 12 V CORDLESS DRILL IRONMAN $177

EY6101EQKW 1/2" chuck IRONMAN 2 batteries 225

Milwaukee

6496-6 10" Compound Slide Miter $568

6497	Delux 6496	648
0234-6	1/2" Magnum Drill	128
0375-6	3/8" Close Qtr Drill	147
0379-6	1/2" Close Qtr Drill	164
0415-21	12VCordless Kit	171
0479-6	12V RAngle Cordless	243
0511-21	14V Cordless	210
3107-1	VS Rt Angle Drill	233
5682	2 Hp Router	164
6020-20	6"RO Sander	153
6025-20	5" RO Sander	134
6101-6	NEW Bandfile	193
6215	Elec. Chainsaw	230
6266	NEW!! Jig Saw	157
6494-6	10" Compound Miter	314
6517-20	New! Quiklok Sawzall	154
6537	VS Super Sawzall	174
6546-1	CordlessScrewdriver	89
6767-1	Screwdriver Kit	135

RYOBI

AP10 Replacement Blades 24.95

HT20VSK	MULTI TOOL	54
DBJ50	Mini Biscuit Joiner	68
OSS450	Spindle Sander	158

BOSCH

B4200 $129 VS Orbital Jigsaw

1587VSK	Jig Saw Kit	189
1604AKX	1-3/4 hp Router	159
1606A	D-Handle Router	179
1609KX	TrimKit	233
1943LED	Heat Gun	109
3283DVS	5" RO Sander	99
3915	Compound Miter	577
B1350	1 3/4 hp Router	109
B1450	2hp VS Plunge Rtr	179
B1550	3hp Router	199
B4050	Inline Jig Saw	99
B7001	VS Detail Sander	78
B7100	1/3 sheet Sander	59

DEWALT

DW682K Biscuit Joiner $198

DW106	3/8" Keyless Drill	73
DW306K	RecipSaw	163
DW321K	Jigsaw Kit	163
DW362K	7 1/4" Circ. Saw	129
DW364	7 1/4" Circ. Saw	161
DW420	5" PSA Ro Sand	74
DW431	3X21 Belt Sander	187
DW443	6" H&L RO Sand	144
DW444	6"PSA RO Sand.	144
DW610	1 1/2 Hp Router	149
DW615	1 1/4 Plunge Rtr	166
DW621	2Hp Plunge Rtr	217
DW625	3Hp Plunge Rtr	277
DW670	Trim Router	98
DW673K	Trimmer Kit	187
DW705	12" Comp Miter	354
DW935	14V Cordl's Saw	158
DW935K	Cordl's Saw Kit	228
DW972K2	12V Cordl' drill	179
DW991K	14V Cordl' drill	198
DW991K2S	14V Combo Kit	339
DW995K2S	18V Combo Kit	379

HITACHI

C8FB2 COMPOUND SLIDE SAW $477

C10FA	10" Miter Saw	299
C10FS	10" Slide Miter	737
C15FB	15" Miter Saw	655
NR83A	Framing Nailer	386
EC12	2hp Compressor	286

SENCO

SLP20 Brad nailer $199

SLS20	Light Duty Stapler	249
SFN1+	2"Finish Gun	269
SFN40	2 1/2" Finish Gun	347
SKSL	1/4" Crown Stapler	274
SN65C	NEW! Framer	397
SCN200R	Coil Rooter	397

AIRFIX

NAIL GUNS 241SNK 16 Ga 3/8-1-1/2"Kit $96

0232SP	18G 1-1/4" Kit	88
E22	shoots pins & staples	137
249SNK	18 Ga 1/4-2" Kit	129
556TP	2-1/2" Finish Gun	202
626SNK	1/4"Crown 1" StaplerKit	99
350NK	2" 16G Brad Gun	169

Air Mate

AIR COMPRESSORS AM78HC4V 1 1/2 hp 2 tank 305

Rol-Air

COMPRESSORS D1500HP5 1.5 hp 4.5 gal tank $299

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5 pc Router Bit 94-100 Cabinet set $167

LU85M010	10" 80T Finish	55
LU84M011	10" 50T Combo	36
LM72M010	10" 24T Rip	35
LU85M015	15" 108T Finish	99
LU92M010	10" 60T Corian®	58
LU96M010	10" 80T Laminates	67

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Pocket hole maker $109

KREG JIG for joining faceframes, butt joints and other pocket hole applications

Makita

LS1211 12" Compound Miter Saw $757

LS1013 NEW! 10" Slide Compound Miter 2-Rail System 577

3606	1 hp Router	106
3621A	1 1/4 hp Pinge Router	159
4200H	4 3/8" Trim Saw	169
4304	Jig Saw	159
4305	Jig Saw	156
6213DWAE	3/8" 12V Cordl'	178
6233DWAE	3/8" 14V Cordl'	198
6313DWAE	1/2" 12V Cordl'	196
6333DWAE	1/2" 14V Cordl'	213
9924DB	3X24 Beltsander	188
AN8300	Framing Nailer	326
LS1030	10" Miter Saw	199
LS1040	10" Compound Saw	258

DELTA

37-070 $257 6" Table Top Jointer

14-650	Hollow Mortise Chiser	238
22-560	NEW!12" planer	397
23-710	Sharpening Center	168
31-060	1" Belt 5" Disc Sandr	86
31-460	4" Belt 6" Disc Sandr	133
31-780	Oscillating Sander	196
32-100	Plate Joiner	254
36-040	8" Compound Miter	149
36-090	Sliding 10" Miter Saw	218
36-210	10" Compound Mit'	248
40-150	15" Scroll Saw	115
40-660	16" Scroll Saw	159

BIESEMEYER

78-900	Commercial T50	324
78-930	Homeshop 28	238
78-931	Homeshop 40	258
78-935	Homeshop 52	268

Detail Sander

Kit w/case & paper VS Msx636-2 $179

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2469	36" w/ hand hole	46
2467	48" w/ hand hole	54
2468	72" w/ hand hole	96
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2700	6 ft 6" —3vial	115
2701	8 ft —3vial	125

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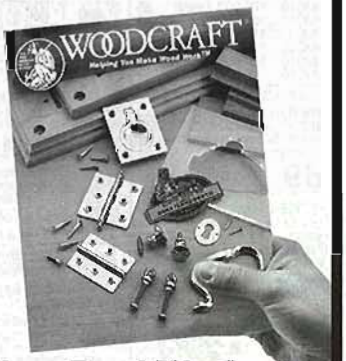

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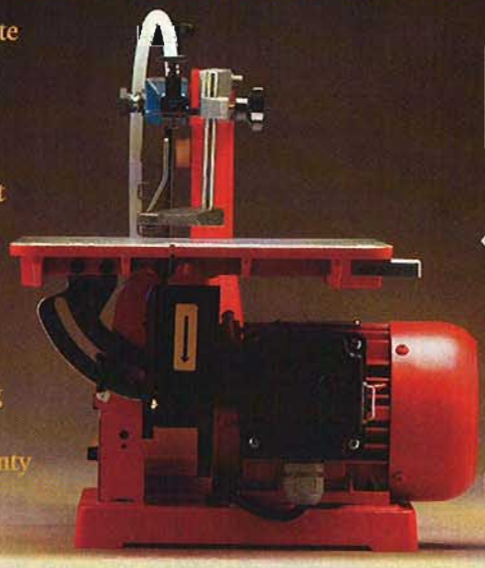

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PRODUCTS THAT PERFORM

Continued from page 102

Loctite introduces a polyurethane glue

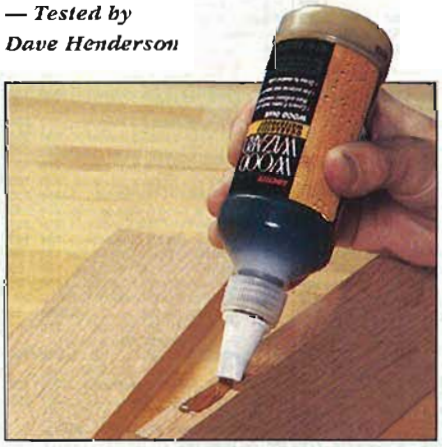
The number of polyurethane wood glues continues to grow, and now Loctite Corporation joins the field. While other polys have been around longer, Wood Wizard Wood Glue proves that the makers of Super Glue have done their homework.

I used Wood Wizard to reglue a broken wooden cutting board. Even though the wood was oil-soaked, the glue created a strong bond. It also worked well in bonding brass tubes inside wooden pen blanks. The glue held strongly and did a good job of filling gaps.

Wood Wizard exhibited an average amount of foaming. However, the dried foam squeeze-out sands easily and it takes stain fairly well right after sanding.

I especially like the design of the bottle's nozzle. The nozzle twists to open, similar to a mustard bottle, but has a slotted opening. The slot lets you lay down a wide, flat bead of glue, as shown in the photo *left*, when edge-gluing boards. This eliminates the need to spread glue laid out in a narrow bead by more typical pointed nozzles. Priced slightly less than its competitors, Wood Wizard's availability in a 4-ounce size is an added bonus, given the relatively short one-year shelf life of polyurethane glues.

— Tested by Dave Henderson



PRODUCT SCORECARD

Wood Wizard Wood Glue

Performance	★ ★ ★ ★ ☆
Price	$3.99 (4 oz.); $6.99 (8 oz.)
Value	★ ★ ★ ★ ★

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DELTA TOOLS

Model	Description	List	Sale
31-695	6" Belt/9" Disc Sander	441	299
23-710	New Sharpening Center	217	169
23-680	6" Bench Grinder 1/4 HP	80	69
31-460	4" Belt/Disc Sander	195	125
40-560	16" 2 speed Scroll Saw	230	155
40-540	NEW 16" var/spd Scroll Saw	249	179
11-990	12" Bench Drill Press	255	184
11-080	32" Radial Bench Drill Press	405	279
43-505	1/2" Bench Router/Shaper	399	289
22-540	12" Bench Top Planer	Sale	329
28-195	NEW 10" Band Saw	390	309
22-560	NEW 12-1/2" Bench top Planer		395
36-465	NEW Versa Feeder Stock Feeder		249
36-220	10" Compound Mitre Saw	294	199
28-185	Bench Band Saw	213	188

NEW Single Stage Dust Collectors

50-850	1-1/2 HP, 1200 CFM	Sale	309
50-851	2 HP, 1500 CFM	Sale	455
37-070	6" v/spd Bench Jointer	351	265
14-650	Hollow Chisel Mortiser	380	239
33-990	10" Radial Arm Saw	991	789
36-905	30" Unifence	348	246
36-906	50" Unifence	444	325

Above fences have $30.00 rebate. Price shown is before rebate !

17-900	16-1/2" Floor Drill Press	490	389
37-190	6" Deluxe Jointer	603	445
36-265	8-1/4" Builders Saw w/ stand	Sale	269
36-210	10" Compound Mitre Saw	344	219
34-555	Sliding Table	487	269
36-250	10" Slide Compound Saw	825	489
31-780	Oscillating Spindle Sander	253	194
46-700	12" Wood Lathe	575	455
37-154	8" Jointer DJ-15	Sale	1289

The following Delta tools have $50.00 rebates ! Take $50 off price shown.

34-444	10" Contractors Table Saw	Sale	659
34-445Z	10" Table Saw w/ 30" fence, cast iron wing, 34-914 table board, & 35-032 blade	Sale	839
28-275	14" Band Saw 3/4 HP	Sale	635
28-280Z	14" Bans Saw 1 HP w/ 50-274 mobile base, 28-843 rip fence, & 28-266 cool blocks	Sale	839
40-650	Q3 18" Scroll Saw	Sale	479
22-675	DC380 15" Planer	Sale	1175
31-280	Sanding Center w/ stand	Sale	789

REBATES EXPIRE 03/31/98

MILWAUKEE TOOLS

6527	NEW Sawzall with case	343	169
6537-2	6527 w/quick tak blade change	224	175
0407-22	12V Drill w/kyls chuck&2 bat	380	175
0224-1	3/8" Drill 4.5 amp magnum	236	132
0234-1	1/2" Drill 4.5A mag 0-850 rpm	255	129
0235-1	1/2" Drill w/keyless chuck	255	135
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255	129
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	213	119
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	207	109
0375-1	3/8" close quarter Drill	255	148
0378-1	1/2" close quarter Drill	289	165
6546-1	cdle Screwdr 200 & 400 rpm	150	89
6547-1	6546-1 w/bits, 1/4" chuck & cs	185	108
5399	1/2" D-handle Hammer Drill Kit	356	219
6507	Original SawZall with case	278	155
5367-1	3.6" v/spd Hammer Drill Kit	275	145
5371-1	1/2" v/ spd Hammer Drill Kit	360	194
3107-1	1/2" v/spd right angle Drill Kit	411	234
3300-1	1/2" v/ spd right angle Drill	378	219
6142	4-1/2" Grinder w/case & acc	224	119
6490	10" Mitre Saw	496	285
6491	6490 w/ carbide blade & bag	594	328
6494	10" Compound Mitre Saw	585	315
6266-6	Top Handle Jig Saw	315	159
6496	10" Slide Compound Saw	1050	589

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10" 40	69	42
LU82M010	Cut-off	10" 60	83	44
LU84M011	Comb	10" 50	79	42
LU85M010	Super Cut-off	10" 80	115	69
LM72M010	Ripping	10" 24	69	38
LU73M010	Cut off	10" 60	84	45
LU87M010	Thin Kerf	10" 24	72	44
LU88M010	Thin Kerf	10" 60	88	49
LU86M010	Ultimate	10" 80	128	68
LU91M010	Compnd Mitre	10" 60	88	54
F410	Quiet Blade	10" 40	95	49
TK303	7-1/4" Finishing	40	38	25
TK906	10" Combo	50	53	32
SD308	8" Dado - Carbide		230	119
SD508	8" carbide w/case & shims		344	168
FB100	16 piece Forstner Bit Set		338	194
94-100	5 pc. Router Bit Door System		320	169

The following Freud tool has a rebate ! The price shown is before rebate.

FT2000E	Plunge Router - $30 rebate	Sale	205
FJ85	Top Hdl Jig Saw	Sale	99
JS102	Biscuit Jointer	Sale	125
TR215	8-1/4" Mitre Saw	Sale	249
FE82	3-1/4" Planer	Sale	99

WAP VACUUMS

Model	Description	List	Sale
766RDF	10 gallon turbo vacuum	845	465
766RDF-D	"Drywaller" 10 gal turbo vacuum	915	549
766RDF-DAS	Above vac w/ auto start	950	589

MAKITA TOOLS

Model	Description	List	Sale
6090DW	3-3/8" Saw Kit 9.6 volt	280	155
DA391D	3/8 angle Drill 9.6V	186	114
DA391DW	3/8" angle Drill Kit 9.6V	341	189
ML900	Incandescent Flashlight 9.6V.		9.95
6095DWE	9.6 volt Drill Kit w/2 batt	Sale	125
6095DWLE2	6095DWE w/flashlight	Sale	139
6095D	6095DW Drill only & cse	Special	65
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28
6203DWAE	9.6V 3/8" Drill Kit w/2 batt	351	159
6211DWHE	12V 3/8" Drill Kit w/2 batt	368	175
6311DWHE	12V 1/2" Drill Kit w/2 batt	399	205

CORDLESS DRILLS WITH 2.0 AMP HIGH CAPACITY BATTERIES

6213DWAE	12V 3/8" Drill Kit	325	169
6233DWAE	14.4V 3/8" Drill Kit	358	198

SUPER CORDLESS SPECIALS

6073DW 7.2V cdls Drill Kit. Variable speed & clutch. Complete with battery, charger, & case. Super Sale 99

9900B	3"x21" Belt Sander w/bag	347	179
9924DB	3"x24" Belt Sander w/bag	360	189
4301BV	Orb. var. spd Jig Saw 3.5A	282	155
JR3000V	v/ spd Recip Saw w/case	264	135
9820-2	Blade Sharpener	433	215
N1900B	3-1/4" Planer with case	263	139
1912B	4-3/8" Planer	352	199
N9514B	4" Disc Grinder 4.6 amp	116	65
DA3000R3/8"	Angle Drill	355	179
2708W	8-1/4" Table Saw	637	309
6403	3/8" Drill Rev. 0-2100 rpm.	115	65
6510LVR	3/8" Drill Rev. 0-1050 rpm.	198	98
6013BR	1/2" Drill Rev. 6 amp	270	149
9401	4" x 24" Belt Sander w/bag	458	225
5007NBK	7-1/4" Circ Saw w/ case	250	125
LS1011	10" Slide Compound Saw	995	429
LS1211	12" Slide Compound Saw	1620	779
3901	Plate Joiner Kit	376	209
3612C	NEW 3 HP Plunge Router	492	259
LS1040	NEW 10" Cmpnd Miter Saw	460	259
LS1013	NEW 10" Dual Compound Slide Miter Saw	1058	589
BO5010	NEW 5" Random Orbit Sander with dust pickup	142	72

SENCO AIR NAILERS

SFN1+	Finishing Nailer 1" - 2" w/ cs	448	299
SN325	Nailer 1-7/8" - 3-1/4"	665	365
SLP20	Pinner w/cs 5/8 -1-5/8"	422	229
SKS	Stapler 5/8" - 1-1/2"	390	279
SN70	Framing -Clip Hd 2"-3-1/2"	725	449
SN65	Framing -Full Hd 2"-3-1/2"	709	465
SFN40	Finish Nailer 1-1/4 - 2-1/2"	569	349

BOSTITCH AIR NAILERS

Model	Description	List	Sale
N80S-1	Stick Nailer	Super Sale	339
N80C-1	Coil Nailer	Sale	338
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	369
N60FN-2K	Finishing Nailer w/ case	557	275
BT35-2K	Brad Tacker 5/8" - 1-3/8" with case, oil, & brads	279	125
CWC100	1 HP Pancake Compressor	440	269
MIIIFS	Flooring Stapler 15 gauge	902	529
S32SX-1K	Finish Stapler-1/2" - 1-3/8" with case & oil	269	145

SKIL TOOLS

77	7-1/4" Worm Drive Saw	Sale	158
77M	77 Mag Worm Saw	Sale	188

PANASONIC CORDLESS

EY6100FQKW	12V Drill kit w/ 2 Ironman batteries, 15 min. charger, & case	379	179
EY6230FQKW	NEW 15.6V Drill Kit with 2 Ironman batteries, 30 minute charger & case	425	215

Batteries for above are NEW 2.0 amp-hr

EY6181CRKW	9.6V Drill Kit w/ 2 batteries, 1 hour charger, & case	307	169
EY3503FQWKW	NEW 5-3/8" 12V Wood Cutting Saw Kit	500	259

PASLODE IMPULSE GUNS

Model	Description	List	Sale
IM250	Trimpulse Finish Nailer Kit	1130	548
IM325	Impulse Framing Nailer Kit	1130	548
CT325SS	Cdls Framing Nailer Kit	1120	495

CLAYTON OSCILLATING SPINDLE SANDERS

140	Portable sndr w/ 4-1/2" spindle	625	559
146	Portable sander w/ 9" spindle	685	609
100	Floor mount sndr 4-1/2" spindle	785	709
106	Floor mount sander 9" spindle	845	759

SIOUX TOOLS

8030	3/8" var/spd Drill	263	165
8000	3/8" var/spd close qtr Drill	211	135
690	5" Air Random Orbit Sander	228	132

NEW Dewalt Bench Top Tools

DW708
12" Dual Compound Slide Mitre Saw
Sale 679

DW788
20" Scroll Saw
Sale 489

DW733
12" Planer
Sale 449

DEWALT
High Performance Industrial Tools

DEWALT TOOLS

Model	Description	List	Sale
DW321K	Top Handle Jigsaw Kit	300	164
DW364	7-1/4" Circ. Saw w/brake	294	162
DW610	1-1/2 HP 2 handle Router	268	152
DW411	1/4 sheet Palm Sander	88	58
DW682K	Biscuit Joiner with case	448	199
DW705	12" Compound Mitre Saw	734	359
DW625	3 HP v/ spd Plunge Router	Sale	279
	DW626 router comes with DW6913 edge guide !		
DW621	NEW 2 HP Plunge Router	400	215
	DW621 comes with Free DW6956 fine height adjuster		
DW675K	3-1/8" Planer with case	292	164
DW431	3 x 21 v/spd Belt Sander	338	188
DW421	5" Palm Ran. Orb Sander	144	74
DW444	6" Ran Orb Sander	266	145
DW443	DW444 w/hook & loop pad	286	145
DW673K	Laminate Trimmer Kit	364	168
DW274	Drywall Gun, 0-4000, 6.3 amp	160	95
DW935K	14.4V 5-3/8" Trim Saw Kit	444	237

DEWALT CORDLESS DRILLS

DW952K-2	3/8" v/spd w/ two 9.6V XR batteries	284	129
DW962K-23/8"	variable speed w/ two 9.6V XR batteries	330	179
DW972K-23/8"	v/spd w/ two 12V bat	362	162
DW904	12 volt flashlight	49	29.95
DW991K-23/8"	variable speed w/ two 14.4V XR batteries	415	209
DW994KQ	1/2" variable speed w/ one 14.4V XR batteries	456	239
	Above drill kits come w/ charger & steel case!		
DW991KS-2	DW991K drill, DW935 trim saw, & case	Sale	345

DEWALT 18 VOLT CORDLESS TOOLS

DW938K	NEW Reciprc Saw Kit	520	289
DW995K	1/2" Drill Kit	428	229
DW997K	1/2" Drill/Hammer Drill Kit	454	249
DW936K	5-3/8" Saw Kit	458	249
DW995KS-2	DW995K Drill, DW936 Saw and case	Sale	385
DW991KC-2	DW991K 14.4V drill kit, DW937 14.4V reciprc saw,& case	349	
DW995KC-2	DW995K 18V drill kit, DW938 18V reciprc saw, & case	395	
DW997KC-2	DW997K 18V drill kit, DW938 18V reciprc saw, & case	405	

HITACHI TOOLS

C9FB2	8-1/2" Slide Compound Saw	1169	469
C10FC	10" Mitre Saw	533	199
C10FS	10" Slide Compound Saw	1627	739
	C10FS has $50.00 rebate until 1/31/98		
C15FB	15" Mitre Saw	1346	659
NV45AB	Coil Roofing Nailer	935	379
NT65AA15	ga. Brad Nailer 1-1/4 -2-1/2"	636	365
C10RA	NEW 10" Table Saw	632	319

BIESEMEYER FENCES

B-50	50" Commer. Saw	443	325
	Above fence has $50.00 rebate !		
T-SQUARE 52	52" Homeshop	350	275
	Above fence has $20.00 rebate !		
T-SQUARE 40	40" Homeshop	395	255
	Above fence has $20.00 rebate !		
T-SQUARE 28	28" Homeshop	325	245
	Above fence has $20.00 rebate !		

REBATES EXPIRE 03/31/98

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe	15.45	8.10	92.50
52	1/2" Black Pipe	12.65	6.95	74.95

BOSCH

Model	Description	List	Sale
1587VS	Top Handle "CLIC" Jig Saw	292	139
1587AVSC	1587VS 50th Anniversary saw with case	Sale	149
1584VS	Barrel "CLIC" Jig Saw	288	139
	Bosch Metal Case for above Jig Saws		24
	Bosch 30 blade assortment for Jig Saws		28.99
	1584VS or 1587VS with steel case and 30 Bosch blades	Sale	176
1295DH	5" Random Orb Palm Sndr	145	89
1274DVS	3"x21" v/spd Belt Sander	301	175
1276D	4"x24" Belt Sander	379	219
1278VSK	NEW 1-1/2"x12" Belt Sander	218	129
1275DVS	3"x24" v/s Belt Sndr	379	214
1276DVS	4"x24" v/s Belt Sndr	408	229
1347AK	4-1/2" Grinder w/cs & acc.	172	89
1194VSR	1/2" v/ spd Hammer Drill	272	165
1194VSRK	above Drill w/ case	303	189
1604A	1-3/4 HP 2 Handle Router	269	142
1613EVS	2HP v/s Plunge Router	369	199
1615EVS	3 HP v/s Plunge Router	536	289
1634VSK	Recip Saw 10.5 amp	335	189
3310K	12V T-handle Drill Kit	345	175
3610K	14.4V Drill Kit	554	195
3107DVS	5" Random Orbit Sander	165	98
3107DVSK	3107DVS with case	195	115
3725DVS	5" Random Orbit Sander	256	149
3727DVS	6" Random Orbit Sander	266	154
53915	10" Slide Compound Saw	1050	559
11224VSR	7/8" SDS Rotary Drill	404	229

STABILA LEVELS

21990	NEW 10" Torpedo Level	Sale	12.95
24640	24" Level w/ hand holes	62.20	43
24670	48" Level w/ hand holes	79.70	55
24610	48" Level w/ angle setter vial	80	55

24610 level comes w/ Free 21990 Torpedo level !

RECORD WOODWORKING VISES

Model	Jaw\Width	Opening	List	Sale
52E	10-1/2"\15"	Quick release	248	109
52D	7"\8"	Quick release with dog	169	75
52-1/2D	8"\13"	Quick release with dog	231	89

PORTA NAILER

401	Porta Nailer complete	295	209
501	Face Nailer complete	295	209

DAVID WHITE

LP6-20	Sight Level package - 20x	329	215
LP6-20XL	LP6-20 w/9055 tripod & 7520 rod		269
LT8-300	Level Transit - 26x	739	489
LT8-300P	above Level w/ optical plum	869	585
LT6-900	Level Transit - 20x	419	258
ALT6-900	Auto Level - Transit - 18x	666	429
ALTP6-900	above Level with tripod & rod	799	499
AL8-22S	Automatic Level - 22x	583	339
AL8-26S	Automatic Level - 26x	654	379

JET TOOLS

JJ60S	6" Jointer - open stand	Sale	429
JJ6CSX	6" Jointer - closed stand	Sale	489
JJ8CS	8" Jointer - closed stand	Sale	1169
JWP124P	12" Benchtop Planer	Sale	369
JWBS14OS	14" Band Saw 3/4 HP - open stand	Sale	499
JWBS14CS	14" Band Saw 1 HP - closed stand	Sale	579
JWTS10JF	10" Contractor Table Saw with 30" Jet fence 1-1/2 HP	Sale	699
JWTS10CWPF	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP	Sale	749
JTAS10X501	10" Tilting Arbor Table Saw with 50" Exacta fence - 3 HP	Sale	1399
JDP17MF	16-1/2" Drill Press 3/4 HP - 16 speed	Sale	429

Maxe6362	FEIN Triangle Sander v/spd		176
Max525	FEIN New Air Triangle Sander		195
LPN672	PONY Air Palm Nailer w/glove		89
RTM01	ROTOZIP Drywall cut out unit		68.95

QUAL-CRAFT PRODUCTS

2200	Pump Jack	79	59
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Workbench & rail holder combo	53	39
2500	Adjustable Roofing Bracket	9.95	7.95
	Buy any 6 (can be assort.) deduct 10%		
2601	Wall Jack	167	108
	Lots of 4 deduct additional 10%		

PORTER CABLE

9444	Profile Sander Kit	220	99
9444VS	New v/spd Profile Sander Kit	207	115
690	1-1/2 HP Router 8 amp	278	149
6931	Plunge Router Base	139	82
693PK	690 and 6931 plus case	Sale	199
691	1-1/2 HP Router D-handle	303	184
692	1-1/2 HP Plunge Router Base	358	184
697	1-1/2 HP Router/Shaper	418	235
698	Heavy Duty Shaper Table	238	135
352VS	3x21 v/s Belt Sander w/bag	321	169
360	3"x24" Belt Sander w/ bag	397	214
360VS	360 Sander w/ variable speed	429	229
362	4"x24" Belt Sander w/ bag	412	224
362VS	362 Sander w/ variable speed	448	239
9125	3-1/4" Planer Kit w/ case	260	145
9118	Porta Plane Kit 7 amp	400	235
505	1/2 sheet Pad Sander	249	139
97649	Top handle Jig Saw 4.8 amp w/ case & blades	275	144
330	Speed Block Sander 1/4 sheet	120	65
556	Biscuit joiner w/5556 fence	Sale	132
345	6" Saw Boss 9 amp	207	119
9647	TIGER CUB Recip. Saw	230	134
9637	Full var/spd Recip Saw 8 amp	276	149
7518	3-1/4 HP Router 2 Handle	469	255
7518	3-1/4 HP 6 speed Router	534	284
7539	3-1/4HP v/spd Plunge Router	534	279
7310	5.6 amp Laminate Trimmer	176	102
97310	Laminate Trimmer Kit comp	338	189
7335	5" Random Orbit Sander	254	135
97355	7335 w/ case & dust pick-up	274	145
7336	6" Random Orbit Sander	259	138
97366	7336 w/ case & dust pick-up	284	149
332	Palm Grip Rndm Orb Sander	133	59
333	above sander with dust bag	148	65
334	333 Sander with PSA pad	148	65
335	NEW Palmgrip Random Orbit Sander with dual flip pad	Sale	85
310	Production Lam. Trimmer	270	154
347K	7-1/4" "Framers" Circ Saw with plastic case	250	129
743K	7-1/4" "Framers" Circ Saw with case - left hand version	250	129
9737	Tiger Reciprc Saw	307	158

Porter Cable Pneumatic Nailers

BN125	Brad Nailer -18 ga. 5/8" - 1-1/4"	144	89
BN200	Brad Nailer -18 ga. 3/4"-2"	238	139
FN250A	Finish Nailer - 16 ga. 1"-2-1/2"	362	189
DA250A	Nailer -15 ga. 1-1/4"-1-1/2"	412	235
FC350	Framing Nailer - clipped head	558	289
FR350	Framing Nailer - round head	558	289
RN175	NEW Roofing Coil Nailer	504	289

NEW Porter Cable Compressors !

CF1400	1 HP, 4 gal. Pancake	Sale	195
CF1540	1-1/2 HP, 4 gallon Site Stack	Sale	295
CF2400	2 HP, 4 gal. Side Stack	Sale	319
9830	9.6V Drill Kit w/ 2 batteries	284	145
9862	12V Drill Kit w/ 2 batteries	382	189
9862F	9862 Drill Kit with flashlight	Sale	189
9863	NEW 12V Drill Kit - pistol grip	319	179
9872	14.4V Drill Kit w/ 2 batteries	424	205

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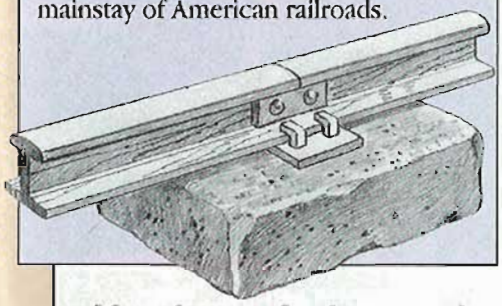
Circle No. 92

Railroads didn't always run on wooden ties

The first railroads in the United States were constructed in Maryland and New Jersey during the 1830s, according to Paul D. Webster in his limited-edition, self-published book, *The Wood Crosstie, a 150 Year Success Story*. These first trains ran on wooden rails with strips of iron secured to them. These "tracks," though, were mounted on stone blocks laid in the railroad bed.

But in 1832, when Robert Stevens, the chief engineer of New Jersey's Camden and Amboy Railroad, had difficulty obtaining stone for new track, he substituted wooden ties hand hewn from trackside forests. The wooden crossties—about 2,500 per mile of track—provided such a smooth ride that from then on they became the mainstay of American railroads.



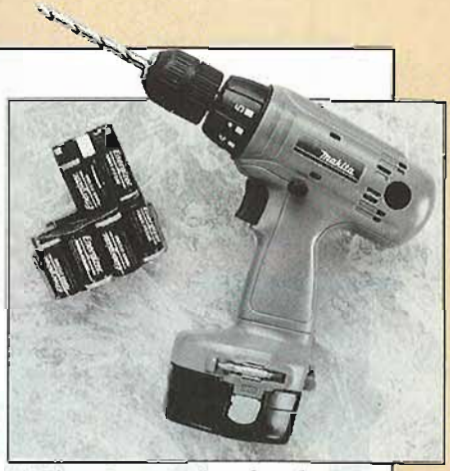
Hardwood plywood and veneer book available

Intended for use by architects, builders, and furniture manufacturers, the 160-page directory *Where to Buy Hardwood Plywood and Veneer* lists more than 175 companies that produce these products. Hobby woodworkers may find it useful, too, since many of the sources sell small lots as well as "seconds" and odd pieces. The book also includes facts about veneers and other industry information. A current copy costs $5 ppd. in the U.S. Request one from the Hardwood Plywood and Veneer Association, P.O. Box 2789, Reston, VA 20195-0789.

Photographs: Mobile Museum of Art; Makita Corporation
Illustration: Jim Stevenson

NiMH for NiCD?

New rechargeable battery technology that substitutes nickel-metal hydride (NiMH) energy cells for ones made of traditional nickel-cadmium (NiCD) was announced by Energizer Power Systems at Chicago's National Hardware Show last August. The NiMH batteries deliver more power and stay charged longer than any power tool battery pack of nickel-cadmium available today. They're lighter in weight, too, claims the company. NiMH cells are also an environmentally preferred energy alternative to NiCD cells, which rely on the toxic element cadmium. Makita Corporation is the first manufacturer to offer the NiMH battery pack for cordless tools. At this writing, the price is undetermined. NiMH packs can be retrofitted, but you'll need a new charger.



Makita Corporation has begun using new nickel-metal hydride battery packs in their cordless tools to boost power.

American turnings return

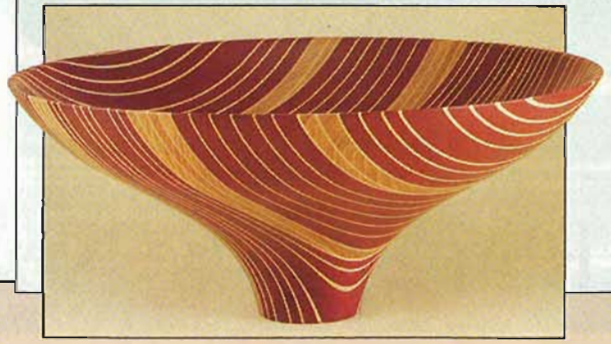
Following an extensive European tour that included stops in 22 cities and 17 countries, the work of more than two dozen American woodturners comes home. After a stint at the Mobile, Alabama, Museum of Art (where it originated in 1993), "Out of the Woods: Turned Wood by American Craftsman" hits the road in the United States.

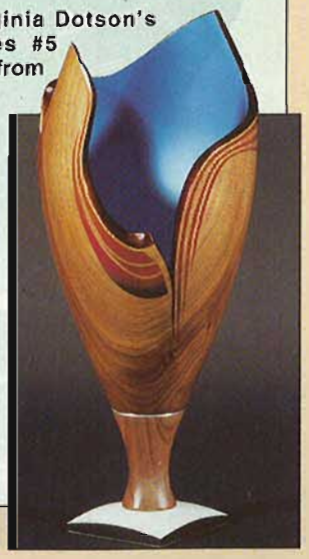
The exhibit, first curated by Atlanta woodturning afficionado and gallery owner Martha Connell as a cultural presentation of the United States government, includes turnings by the nation's top artisans. In addition to the work of Philip Moulthrop, Giles Gilson, and Virginia Dotson, shown *below*, you'll find creations by Rude Osolnik, Mark Lindquist, Dale Nish, David Ellsworth, Alan Stirt, and Bob Stockdale. Look for "Out of the Woods" this year in a city near you. For a complete tour schedule, call the Mobile Museum of Art, 334/343-2667. Fax 334/343-2680.

Left. **Turned from a white pine node, this 1990 piece by Philip Moulthrop stands 10½" high.**

Below right. **Giles Gilson's 17×7" Acceptance is made of walnut, aluminum, and Corian, with acrylic paint.**

Below. **Virginia Dotson's Dune Series #5 was turned from laminates.**





Cab Fourward.

Ram The New Dodge

The truck that changed the rules was already foremost in available payload and towing. And now Dodge Ram is fourmost in accessibility. Introducing the new Ram Quad Cab™... the industry's first and only four-door, extended-cab pickup.†

Ram Quad Cab's four doors open to the roomiest interior of any extended cab,† a newly redesigned instrument panel and a new, standard passenger-side airbag.††

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All comparisons based on data available at time of printing.

†Excludes Crew Cabs. ††Always use seat belts. Remember a backseat is the safest place for children. Rearward-facing child seats can be used in the front seat only with the passenger airbag turned off. *Based on Strategic Vision's 1995, 1996 and 1997 Vehicle Experience Studies™ of 31,440 ('95), 35,652 ('96) and 31,521 ('97) Oct.-Nov. new vehicle buyers of 170+ ('95) and 200+ ('96 and '97) models after the first 90 days of ownership.

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No name change, no change in color, just true CMT like always.

It's the only router with 30 years worth of reputation of quality production behind it - and that's the way it remains today - top notch router bits and boring bits made in Italy using only the best materials around

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not cast in molds, so you get strength and support in every router shank and body

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of our own exact specifications to last longer and give you many more resharpenings than the average bit and the

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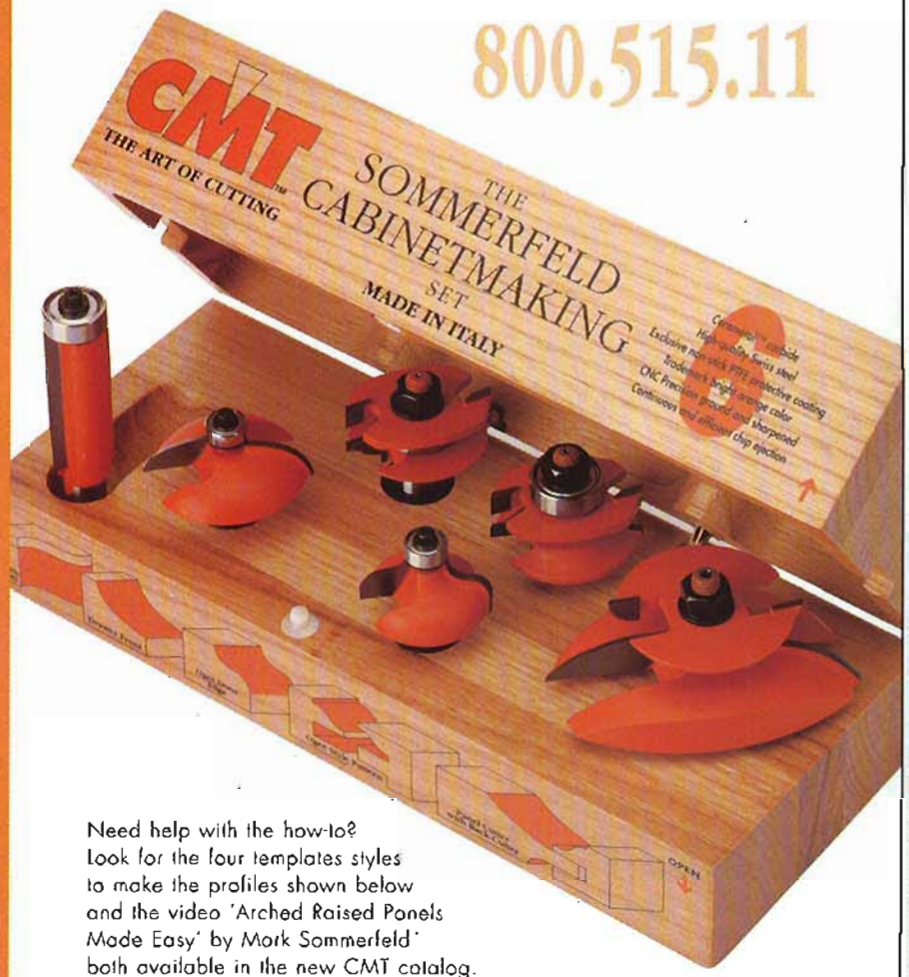
in the world so you get bits that are concentrically machined, perfectly balanced and laser sharp

The quickest way to find us?
Ask for the orange one

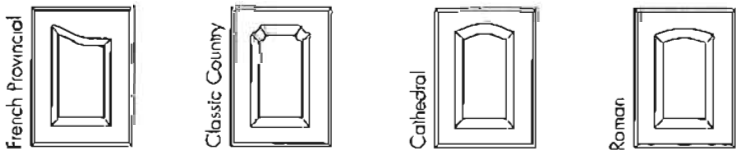
everyone knows only CMT applies **orange non-stick PTFE coating** at 750° F so your bit works smoother without gumming up and burning.

CMT and orange our trademarks

So, if you want the best results from your workshop, don't be confused by a guy in a tuxedo selling some other color bits. Demand the best bit on the market CMT, made in Italy.



Need help with the how-to?
Look for the four templates styles to make the profiles shown below and the video 'Arched Raised Panels Made Easy' by Mark Sommerfeld' both available in the new CMT catalog.



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Circle No. 1312

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WOOD PATTERNS

- **Pendulum Wall Clock** 42
- **All-around Table** 47
- **Hands-Off Bagel Slicer** 58
- **Lift-Up Router Table** 62
- **Staved Vase Jigs** 70

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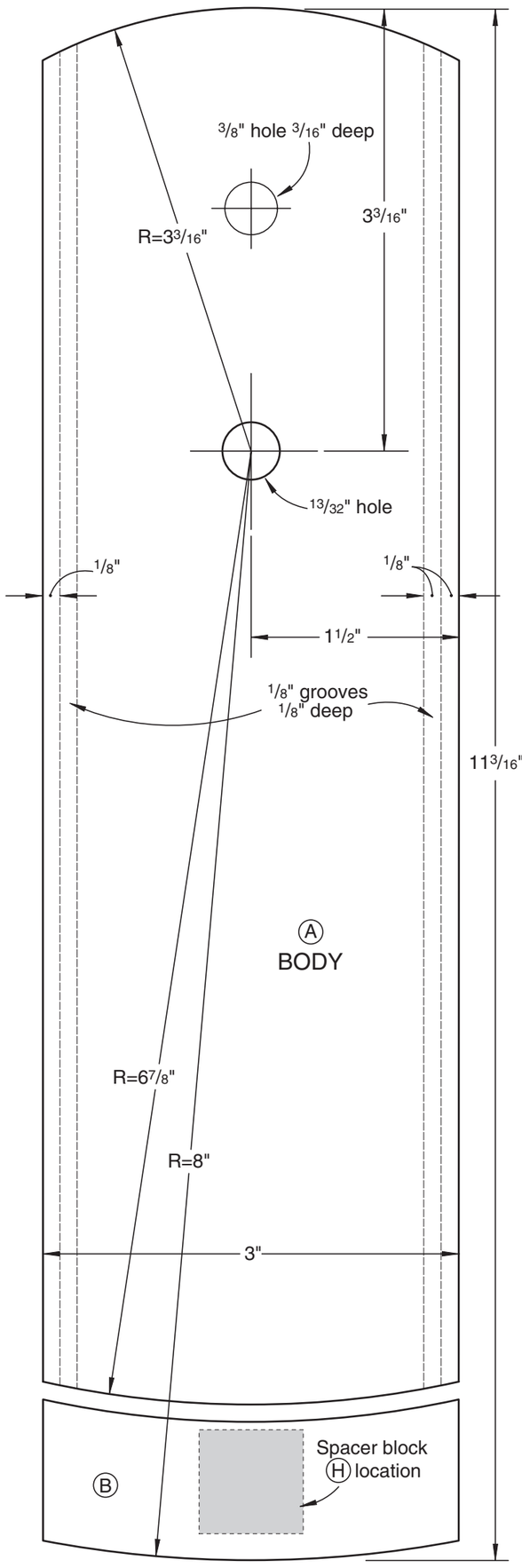
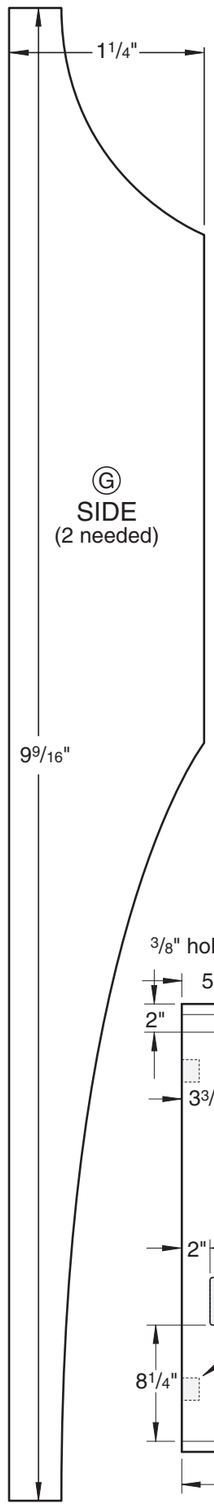
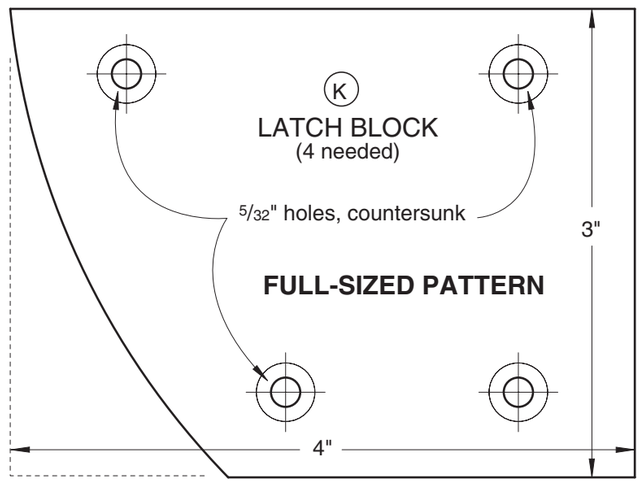
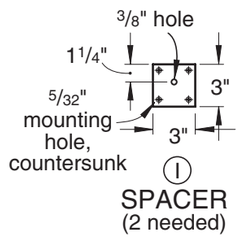


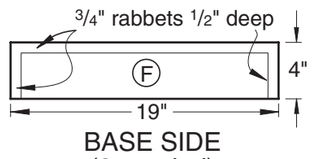
Pendulum Clock
FULL-SIZED PATTERN
See page 42
(additional patterns on other side).



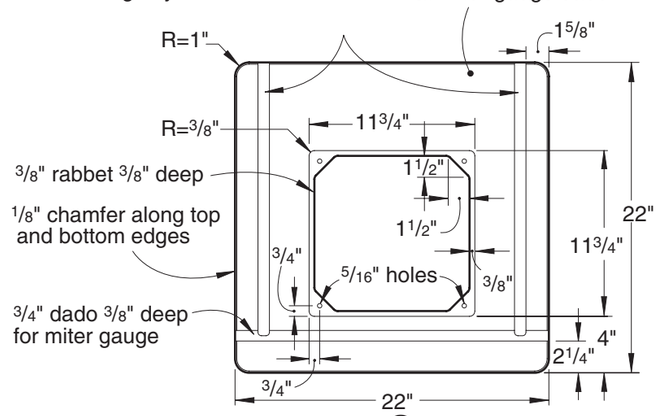


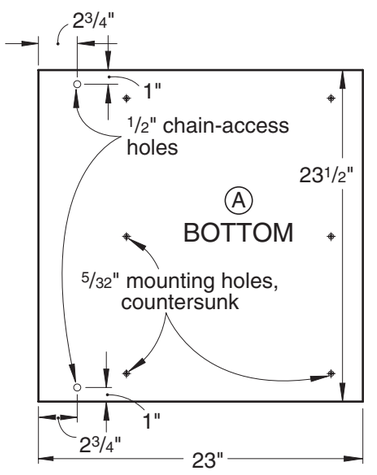
Router Table
PART VIEWS
See page 62





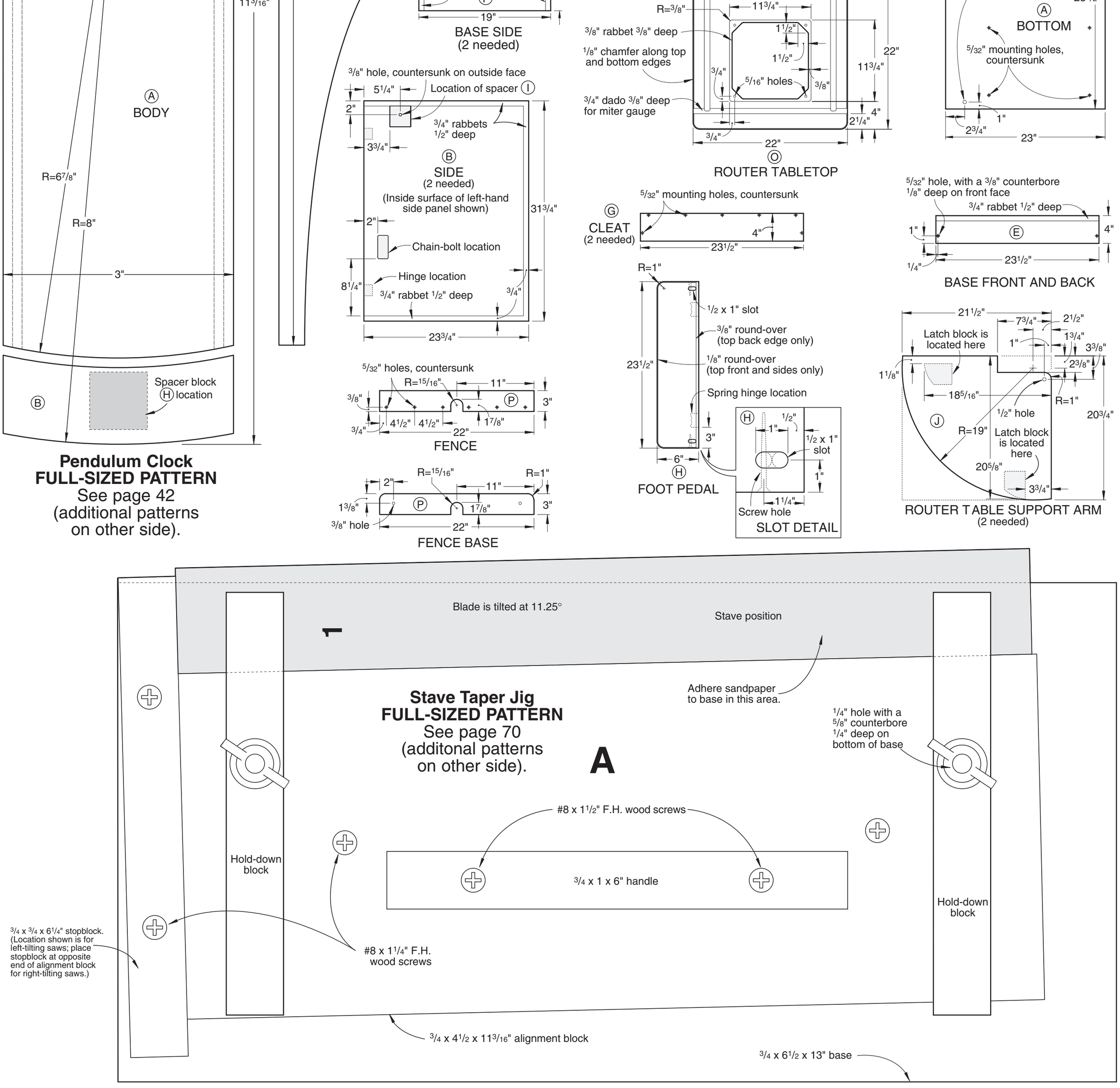
Note: Plastic laminate is applied to top and bottom surfaces before cutting any holes or dadoes.

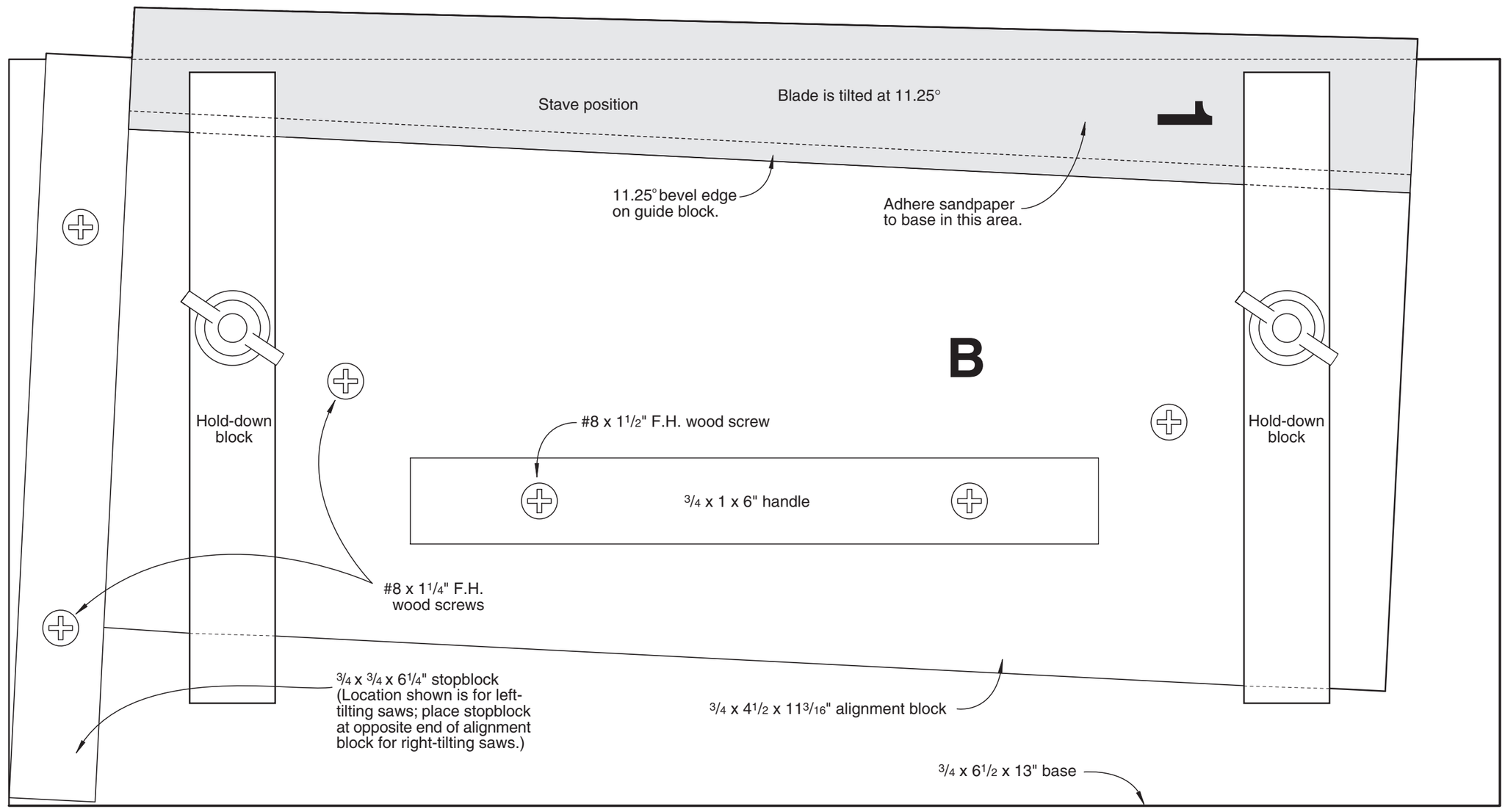




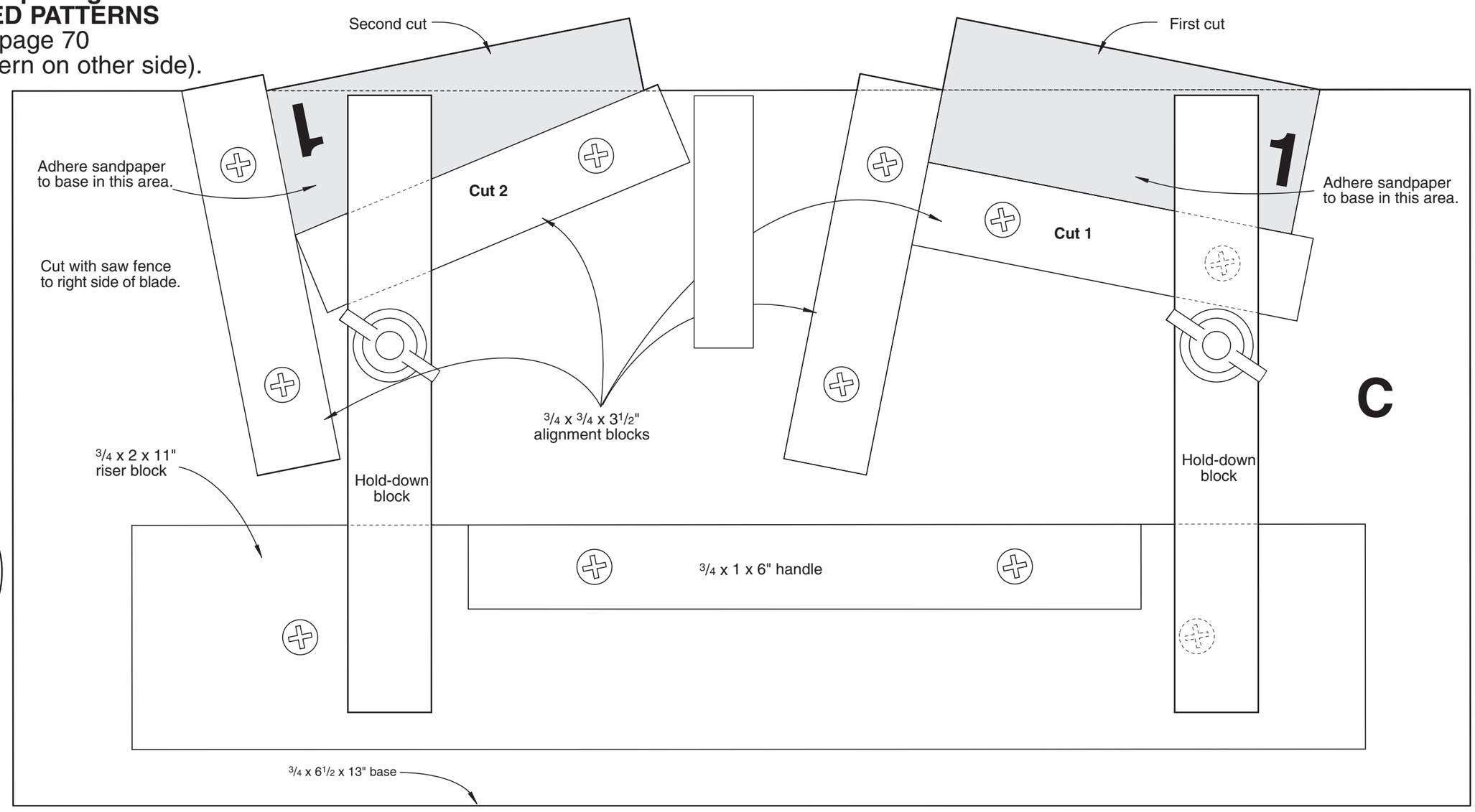
Stave Taper Jig
FULL-SIZED PATTERN
See page 70
(additonal patterns on other side).

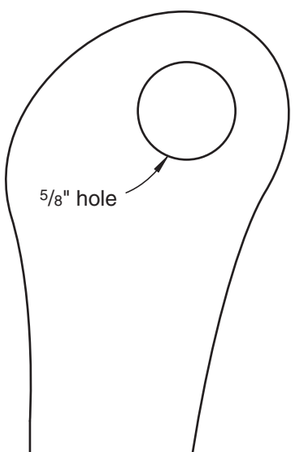
A


Blade is tilted at 11.25°
Stave position
Adhere sandpaper to base in this area.
1/4" hole with a 5/8" counterbore 1/4" deep on bottom of base
Hold-down block
#8 x 1 1/2" F.H. wood screws
3/4 x 1 x 6" handle
Hold-down block
3/4 x 3/4 x 6 1/4" stopblock. (Location shown is for left-tilting saws; place stopblock at opposite end of alignment block for right-tilting saws.)
#8 x 1 1/4" F.H. wood screws
3/4 x 4 1/2 x 11 3/16" alignment block
3/4 x 6 1/2 x 13" base

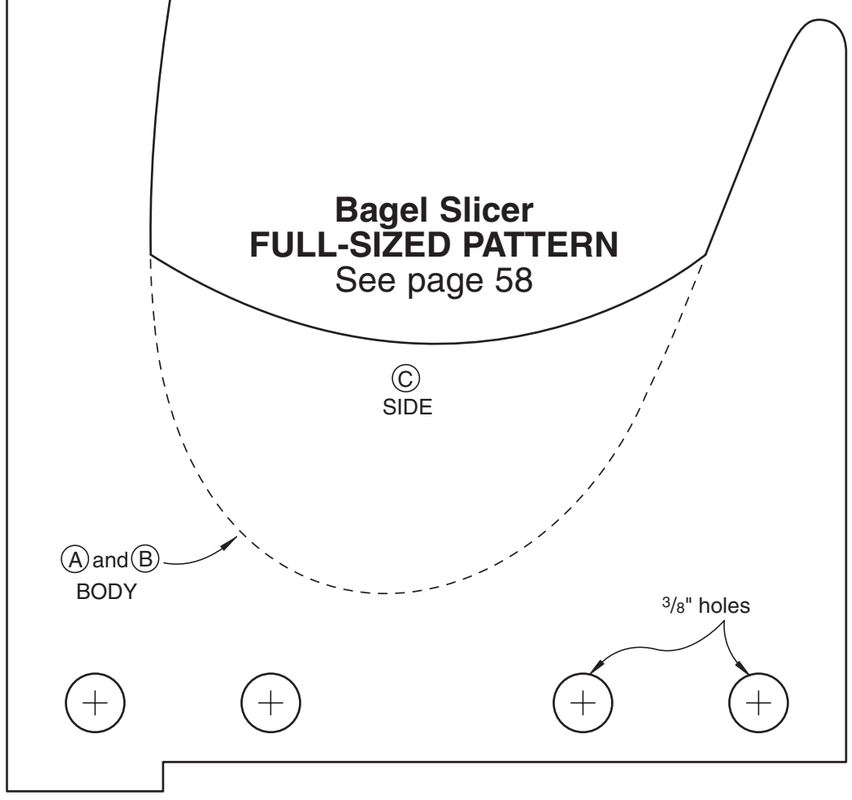

Stave position
Blade is tilted at 11.25°
11.25° bevel edge on guide block.
Adhere sandpaper to base in this area.
B
Hold-down block
#8 x 1 1/2" F.H. wood screw
3/4 x 1 x 6" handle
Hold-down block
#8 x 1 1/4" F.H. wood screws
3/4 x 3/4 x 6 1/4" stopblock (Location shown is for left-tilting saws; place stopblock at opposite end of alignment block for right-tilting saws.)
3/4 x 4 1/2 x 11 3/16" alignment block
3/4 x 6 1/2 x 13" base

Stave Taper Jigs
FULL-SIZED PATTERNS
See page 70
(additional pattern on other side).


Second cut
First cut
Adhere sandpaper to base in this area.
Cut 2
Cut 1
Adhere sandpaper to base in this area.
Cut with saw fence to right side of blade.
C
3/4 x 3/4 x 3 1/2" alignment blocks
3/4 x 2 x 11" riser block
Hold-down block
Hold-down block
3/4 x 1 x 6" handle
3/4 x 6 1/2 x 13" base



Bagel Slicer
FULL-SIZED PATTERN
See page 58



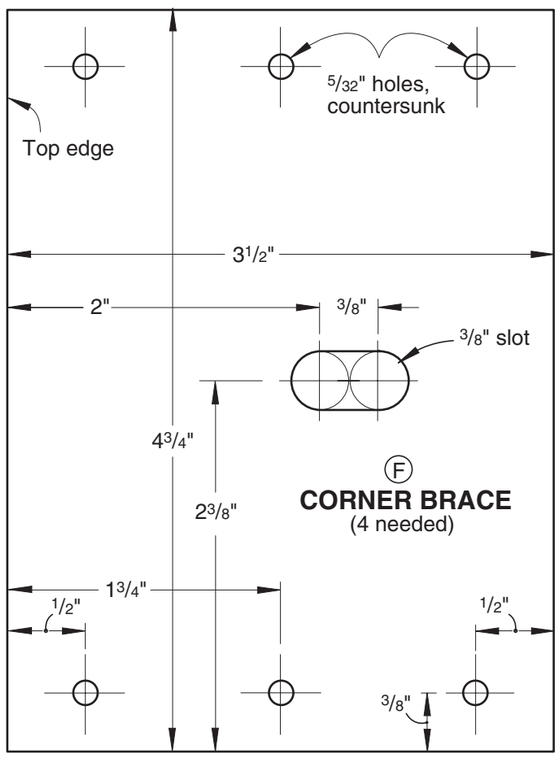
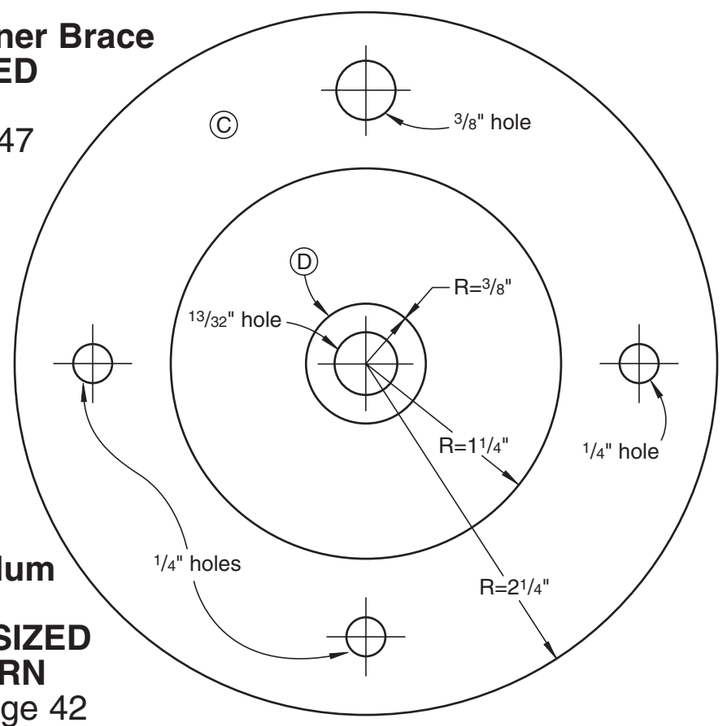


Table Corner Brace
FULL-SIZED PATTERN
See page 47



Pendulum Clock
FULL-SIZED PATTERN
See page 42
(additional patterns on other side).